Strandhill SEC

Energy Master Plan



2022

seai SUSTAINABLE ENERGY AUTHORITY OF IRELAND

SLIGO COUNTY COUNCIL
COMHAIRLE CHONTAE SHLIGIGH

GlobalGreen

This Energy Masterplan is a calculated first stage in the development of a low carbon energy solution for the Strandhill SEC area which will also help with quality of life, sustainability, thermal comfort, health and climate change as well as change energy usage across a multitude of sectors, community, public, residential, marine and agricultural sectors.

Our Vision is an inclusive, collaborative and resilient community in the Strandhill SEC area that actively improves quality of life and well-being for all by implementing suitable sustainable energy systems for our community and environment.

Our core principles are;

- To identify potential sustainable energy generation and educational resources.
- To adopt optimal business models to develop sources and uses for sustainable energy and allowing for the greatest degree of community ownership.
- To provide training and employment, initially by raising awareness of sustainability through education and to assist people in acquiring the skill-sets of 'energy champions' and within the community.
- To lead the transition from dependency on fossil fuels to sustainable energy sources and uses.
- To collaborate with national bodies, local authorities and stakeholders to identify and assist in removing barriers which may hinder communities in achieving EU climate and energy targets.
- To learn through achievement and lead by example.;

seai SUSTAINABLE ENERGY AUTHORITY OF IRELAND	**This study was funded by the Sustainable Energy Authority of Ireland in the framework of its Sustainable Energy Communities Programme.**
GlobalGreen	Global Green were commissioned by Strandhill Sustainable Energy Community (SEC) to develop the Energy Masterplan.

1.1 Action Plan

This section outlines 11 key steps for Strandhill SEC to undertake the implementation of this Energy Master Plan:

Awareness:

1. Disseminate the EMP among the community to raise awareness and understanding of its purpose and the opportunities it presents. Dissemination activities should be tailored to the needs of specific target groups, in terms of format and content, and emphasise what they can gain from it.
2. Continue communicating and engaging with target groups, promoting the SEC and its achievements, and encouraging further stakeholder involvement. Share your experience and the knowledge acquired in the process of 'doing' with a wider audience outside of your community, including with other SECs, in the framework of outreach and networking activities.

Community:

3. Conduct community engagement and outreach activities as an extension of dissemination activities, with the purpose of generating commitment to the EMP's vision and goals, and encourage community members to take action for its implementation. Where and when appropriate, the outreach activities will play a key role in recruiting participants in a community-led sustainable energy project. Engaging with other community-based organisations such as sports club, parish organisations, environmental groups, etc. will be essential in generating partnerships.
4. While a focus on sustainable energy projects is important to maintain the momentum, the SEC's capabilities can be exploited to tackle related issues such as environmental conservation, heritage preservation, health and well-being, etc. This will broaden the reach and impact of the SEC.

Education:

5. Build capacity within the local community to develop and implement sustainable energy projects, by creating opportunities to increase knowledge and gain experience in relevant areas. This can be done by leveraging existing educational and training initiatives available from SEAI as well as local vocational & third-level education bodies. Learning by doing and peer knowledge exchange is also very powerful in this regard.
6. Continue availing of 'soft support mechanisms' from SEAI's SEC programme, in particular at project development stage. Having identified key gaps in the SEC's competencies, request

technical assistance from SEAI's panel of experts. SEAI's mentors can also help with coaching on organisational aspects as well as community engagement activities.

Private & Public:

7. Set-up the community structures and processes required to lead the development and implementation of BEC-type projects for Community, Private and Public projects, having selected a delivery model appropriate for the SEC. These should include project management, financial management, health and safety, grant administration, and cover appropriate steps in the project cycle, from development of a project pipeline, design and specification of measures, procurement, site supervision, commissioning and handover. As mentioned before, the transition from a volunteer-led effort to having staff in place for the day-to-day management of projects will be essential to sustain the implementation of the EMP in the medium to long-term.
8. Pilot community-led sustainable energy projects in the local area, in the framework of the Community Energy Grant Programme. Such projects can be modest initially, to start building experience and capability, learning by doing, with reduced risk exposure. Over time, the scale and complexity of projects will increase, and so will their impact on the local area's energy usage. The Register of Opportunities attached alongside this report, and specific project & measures identified in the sectorial analysis in occurring chapters, provide an essential foundation block to develop the project pipeline.
9. Evaluate regularly the performance of the SEC and the impact of its projects, using the objectives and Register of Opportunities of the Energy Master Plan as a benchmark. This evaluation process should feedback into the SEC's policies, plans and processes, learning from successes and more importantly failures.
10. Leverage the potential investment and annual savings identified in the Register of Opportunities to foster local economic development. In addition to job creation by the SEC for SEAI Community Energy Grant Scheme project management, there will be many jobs involved in the design, installation and maintenance of energy efficiency and renewable energy systems
11. Leverage a Continuous Improvement Model, which combines economic, social, energy efficiency and renewable energy to develop opportunities in the local economy.


1. Clearly defined goals and objectives
2. Clearly defined roles with identified responsibilities
3. A genuine desire and commitment to succeed, learn and innovate from everyone
4. Methods to measure and monitor your progress
5. Fast and effective Gap Resolution strategies
6. Efficient and effective systems
7. Effective plans to develop knowledge, skills and competencies

Document Lead Sheet

Document Title	Strandhill SEC Energy Master Plan
Client	Strandhill SEC
Address	Strandhill, Co. Sligo

Issue	Status	Date	Author	Signed for and on behalf of	
				Global Green	**Client**
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Executive Summary

This study has been commissioned by the Strandhill SEC in order to produce an Energy Master Plan (EMP) for the Strandhill Area as shown below:

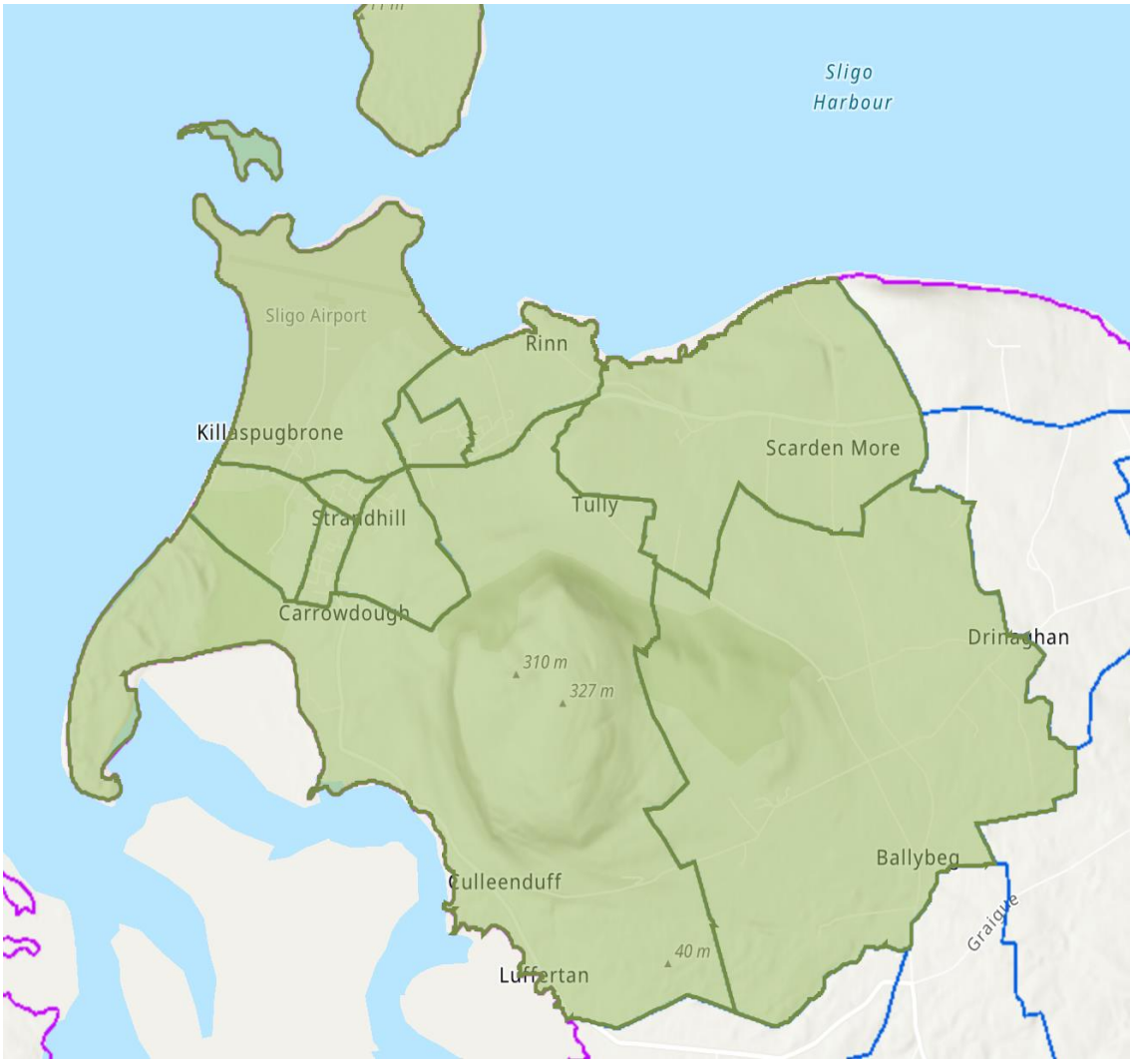


Figure 2-1 SEC Study Area

This EMP provides a roadmap for the transition of the local community towards energy efficiency and renewable energy which will help the local community to understand their energy needs and how energy saving opportunities can be achieved. The EMP Will also illustrate how energy could be supplied locally in a low carbon manner, in the future. The document will then be used within the local planning process to help determine development within the Strandhill SEC Area, and to ensure that it meets the community's priorities and wishes and that it will enable Strandhill to becoming a low carbon, high resilience settlement.

2 Introduction

The Strandhill Community Development Association (SCDA) exists to provide a voice and to attempt to improve the lives of the residents of Strandhill Village by being the official voice of the community to Sligo County Council and other concerned bodies.

Strandhill Sustainable Energy Community was set up in September 2019 and operates as a subgroup of SCDA.

2.1 Strandhill Sustainable Energy Community Charter

Our Vision…

To become a community whose residents and business owners are more efficient in their use of energy.

We will do this by…

Increasing the community's awareness of climate change and informing them of what they can do to reduce their carbon footprint.

We will provide a focal point to support homes and businesses in becoming more energy efficient.

We will work together…

With all community stakeholders including Strandhill Community Development Association (SCDA), homes, schools, tidy towns and local businesses to drive towards a more sustainable future by becoming more energy efficient.

We commit to

- Gaining a comprehensive understanding of the energy use of buildings in the region
- Informing the community of the economical energy efficient choices available
- Taking steps to increase the biodiversity and planting vegetation to sequester carbon.
- Supporting homeowners, community groups, schools and businesses to reduce energy costs
- Reducing our reliance on fossil fuels through energy management and renewable energy
- Determining a work plan to reach our vision
- Collaborating with the SEC Network and the SEAI to provide feedback, share knowledge and contribute to the national movement of Sustainable Energy Communities

2.2 Global Green

Figure 2-1 Niall Kiernan, Global Green

Global Green were appointed by Strandhill SEC as their EMP Consultant. Global Green have completed multiple Energy Master Plans throughout Ireland. The Global Green principles place innovation at the heart of the organisation and in the Sustainability field.

With a team of energy efficiency, renewable energy and energy efficiency design engineers Global Green's vision is to instill energy efficiency and renewable energy into communities long after the formation of the EMP.

For more info please visit: global-green.ie/seai-sec

2.3 Sustainable Energy Communities

The Sustainable Energy Authority of Ireland (**SEAI**) has established a dedicated Sustainable Energy Communities (SEC) Network. The **SEC Network** is a support framework designed to enable a better understanding of how communities use energy and to save energy across all sectors. A SEC is a community in which everyone works together to develop a sustainable energy system. To do so, they aim as far as possible to be energy efficient, to use renewable energy where feasible and to develop smart energy solutions. A SEC can include all the different energy users in the community including homes, sports clubs, community centers, churches and businesses. The SEC process aims to help communities to:

- Achieve financial and energy savings
- Improve public wellbeing through enhanced comfort from energy efficient buildings
- Boost local employment
- Promote community building through partnership approach
- Build capacity and leverage funding
- Contribute to national energy reduction target

Further information on the SEAI's SEC programme can be found at www.seai.ie/SEC/

2.4 What is a community Energy Masterplan (EMP)?

Energy Master-planning is defined as the assessment of the supply and demand of energy on a regional or sub-regional level. It aims to ensure that energy projects are developed in a planned and structured way and is used to identify opportunities to connect energy (including heat) resources with demands in the most cost effective, sustainable and low carbon manner.

2.5 Energy Master-Plan Approach

Baseline energy data was collected and correlated which included:

- In February 2021 Strandhill SEC undertook a community survey to gather baseline data on energy usage patterns in the community. 38 responses were gathered as part of this exercise, the results of which are included in the EMP.
- Desk study research and energy survey forms of local energy use - such as fuel types, energy systems, energy spend etc.
- Data analysis and reporting.
- Completion of Energy audits of local buildings
- Establishing a Building Energy Rating (BER) baseline on homes including Heat Pump Assessments.

The data and information collected have been processed using modelling tools and methodologies developed by Global Green and outlined where appropriate in their respective sections in this EMP.

SEAI Sustainable Energy Communities (SEC) Energy Master Plan

The SEAI SEC partnership approach aims to enable bottom-up community energy solutions. Such a task cannot be achieved in isolation. The SEC Energy Master Plan is developed to collect local energy data and develop a register of opportunities for the energy saving measures for the community.

3 EMP Strategy

The SEAI SEC partnership approach aims to enable bottom-up community energy solutions. Such a task cannot be achieved in isolation. The SEC Energy Master Plan is developed to collect local energy data and develop a register of opportunities for the energy saving measures for the community. The purpose of the EMP is to establish a baseline of current energy consumption, an assessment of appropriate Renewable Energy (RE) resources and potential within the SEC study area and a Register of Opportunities (ROO), as illustrated in Fig 3-1, which will provide the roadmap for the SEC to deliver energy projects in the coming years.

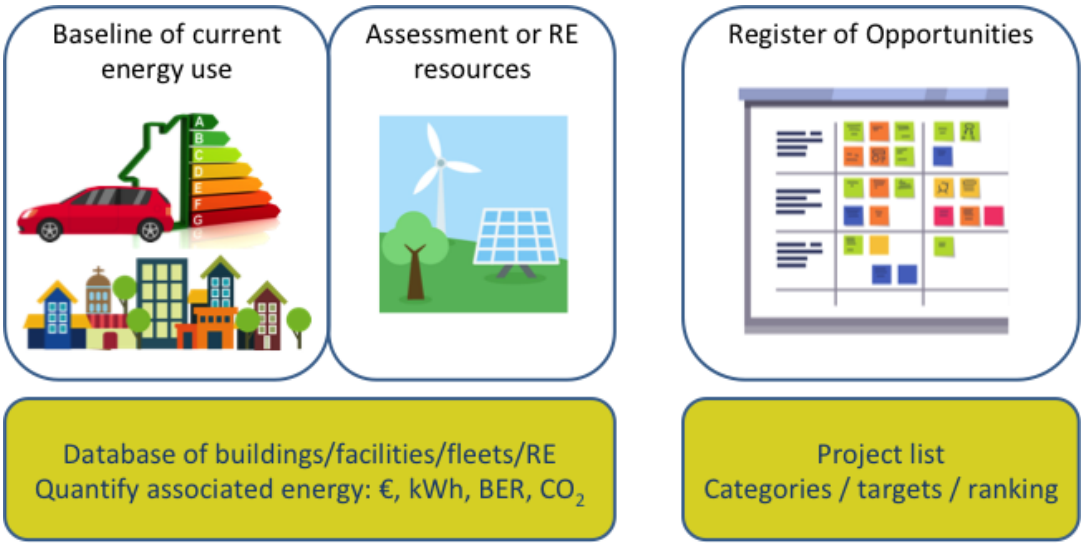


Figure 3-1 EMP & ROO

The EMP process and tasks are outlined in Fig 3-2 below. The process was generally sequential, but earlier elements were revisited as the work progresses.

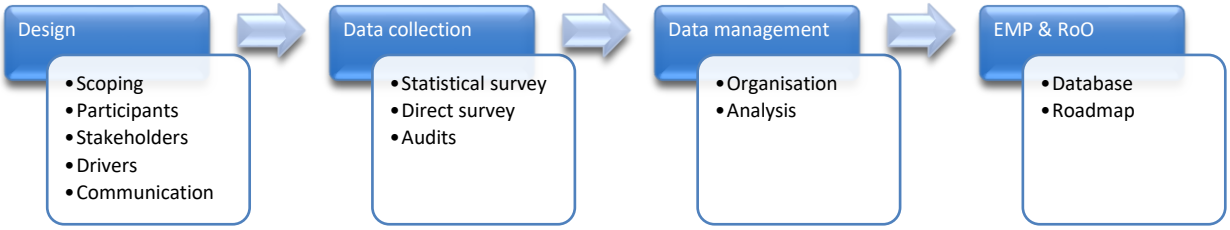


Figure 3-2 EMP process

Energy conservation and efficiency and developing an energy action plan for longer term projects is the key aim.

Baseline energy data was collected and correlated which included;

- Desk study research of local energy use - such as fuel types, energy systems, energy spend etc.
- Data analysis and reporting.
- Completion of Energy audits of local buildings

The data and information collected have been processed using modelling tools and methodologies developed by Global Green and outlined where appropriate in their respective sections in this EMP.

The transition to a low carbon economy and implementation of EMP's can have many benefits, as illustrated below.


SECURE STABLE ENERGY SUPPLY
Creating a diversified energy supply locally reduces the risk of blackouts
Creating energy locally offers increased energy security by protecting against raising pricesAffordable energy helps reduce fuel poverty
STRENGTHENING COMMUNITIES
Improved local understanding of energy and climate change can inspire others about what can be achieved when communities work together.
Outcomes can improve community cohesion and wellbeing, and reduce inequality by creating shared goals and shared benefits
Secure locally owned energy can increase the resilience of local communities
REDUCING CARBON EMISSIONS
Joint decision making around low carbon energy enables communities to take ownership of, develop local solutions and to reduce carbon emissions from home it also reduces transport emissions (shipping and road) by maximising use of local resources
EFFICIENT USE OF ENERGY
EMPs can help ensure the use of unused heat and energy opportunities, which otherwise may go to waste. It enables planning of technologies so they provide the most efficient use of the fuel from primary fuels
ECONOMY AND HEALTH BENEFITS
EMP's can provide economic opportunities, employment, apprenticeships and training opportunities up and down the supply chain. Implementation of energy options can enable regeneration.
Planning and implementation can reduce fuel poverty by improving energy efficiency and providing affordable energy locally. Improvements can also reduce the health impacts (including early deaths) associated with damp and under-heated homes. Improved local air quality can lead to health and wellbeing benefits

4 Policy Context

4.1 National policy and European Directives

The Irish Government has approved a new climate action bill that will put the country on the path to net-zero greenhouse gas emissions by 2050. The Climate Action and Low Carbon Development Bill contains a National Climate Objective and commits Ireland to "pursue and achieve" carbon neutral status by the end of 2050. The Bill also seeks to achieve a 51% reduction in Ireland's emissions by the end of the decade and would enable the transition to a climate-resilient, biodiversity-rich, environmentally sustainable, and climate-neutral economy by 2050. By 2030, the government aims to achieve the following:

- Cutting greenhouse gas emissions by at least 30%
- Reaching a target of at least 32.5% energy efficiency
- Delivering 70% renewable electricity

In June 2021, the EU adopted a European Climate Law, establishing the aim of reaching net zero greenhouse gas emissions (GHG) in the EU by 2050. The law sets an intermediate target of reducing GHG by at least 55% by 2030 compared to 1990 levels.

Strandhill SEC Energy Master Plan, aim to fulfil the goals of the Climate Action Bill by kick-starting energy efficiency and renewable energy across the Strandhill SEC Area.

To boost energy performance of buildings, the EU has established a legislative framework that includes the Energy Performance of Buildings Directive 2010/31/EU (EPBD) and the Energy Efficiency Directive 2012/27/EU. Together, the directives promote policies that will help:

- achieve a highly energy efficient and decarbonised building stock by 2050
- create a stable environment for investment decisions
- enable consumers and businesses to make more informed choices to save energy and money

The EU Energy Performance in Buildings Directive (EPBD) legislation is also of high relevance to the current work.

5 Residential Energy Profile and Efficiency Opportunities

5.1 Residential Baseline Energy Usage

Consumption	Total Energy Spend per Annum	Carbon Emissions toness Co2/annum
13,526,182	€2,543,306	4,349

Table 5-1 Residential Baseline Energy Usage

Residential Energy Audit						
Year Built	Type	Floor Area (m^2)	Current HLI	Estimated BER	New BER	New HLI
1999	Mid-terrace house	108	1.77	C2	A3	1.327
2007	Detached House	126	2.23	B3	B1	1.77
1980	Mid-terrace house	79	2.16	C1	B1	1.64
2002	Semi-detached house	130	2.32	C3	B1	1.80
2001	Semi-detached house	110	2.28	C2	A3	1.63
2006	Semi-detached house	158	1.71	B3	B3	1.57
1992	Detached House	153	2.21	C1	B1	1.72
2003	Detached House	149	2.06	B3	B1	1.74
2002	Semi-detached house	139	2.31	C2	A3	1.61

Table 5-2 Summary table of home energy audit analysis

The above table outlines the sample homes that received one of eight home energy audit that was available as part of the Strandhill Energy Master Plan.

The Central Statistics Office (CSO) provide basic statistics that describe the housing stock at the local electoral area level (in this case Strandhill SEC EMP Area. The area has a population of 2,455 with a total of 914 households. The baseline energy usage is for the residential sector and the figures are based on the housing stock level in the study area.

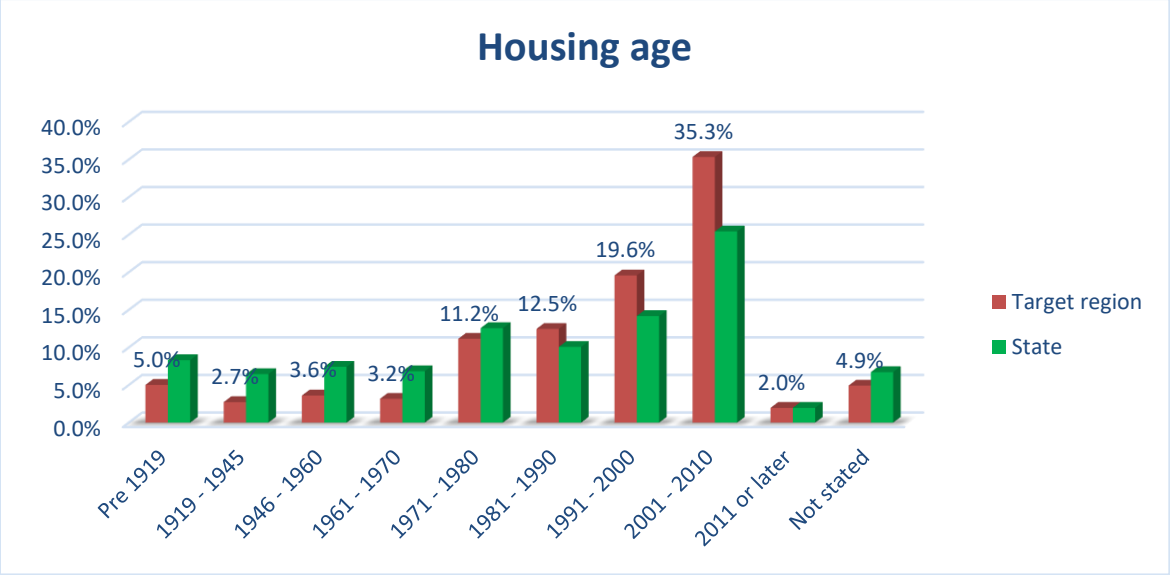
For the 914 occupied dwellings the annual energy spend is circa €2,900, 14,799 kWh per house. The annual electricity spend per house is circa €1,300, 3,385kWh and the annual thermal spend circa €1,600, 11,414kWh.

Energy demand in our homes is the result of our need for heat to keep warm and provide hot water, and electricity to provide lighting and power appliances. The size, shape and nature of the buildings themselves and the technology used to provide heat, light and other household energy services has a significant influence on how this demand for energy services translates into the figures we see on our energy bills.

From analysis of the data in the SEC area, there is a large dependency on fossil fuels (oil, coal and turf). There is an opportunity to improve energy efficiency and transitioning to cleaner fuels and /or electric heating (heat pumps, storage heaters). The majority (66%) of the houses in the area are pre-2000. The key focus of the domestic properties in the SEC area should be on retrofitting homes for energy efficiency and then transitioning to renewable energy opportunities. Fabric first should be the approach and then looking at heating source. Attic insulation (300mm), wall insulation LED lighting and draught proofing could provide the best return on investment for initial projects. For a full scope of works please see Section 5.2.

The Climate Action Plan 2030, unveiled by the Government in November 2021, has an ambitious national retrofitting programme as a central plank of its strategy. It sets out a target to upgrade half a million existing homes to high energy efficiency standards over the next decade. The target for the retrofitting of a domestic property would be to have the property up to the standard of BER B2. The department is hoping a hybrid model combining grants and low-interest loans will entice homeowners to upgrade their homes.

The following graphs display the housing information in the SEC Area from housing age to house type.



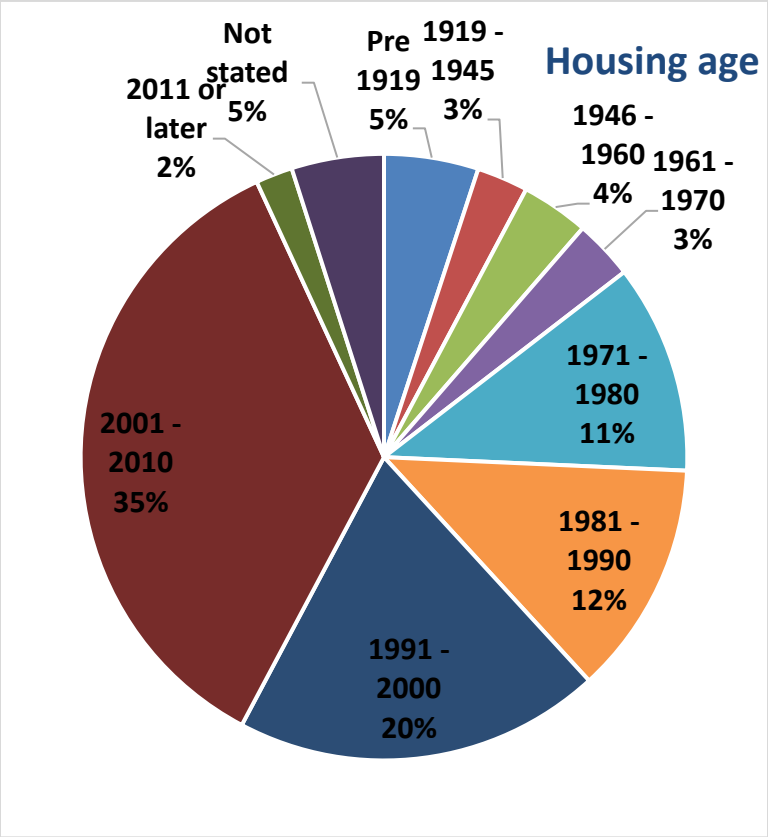


Figure 5-1 Housing Stock (Age Comparison)

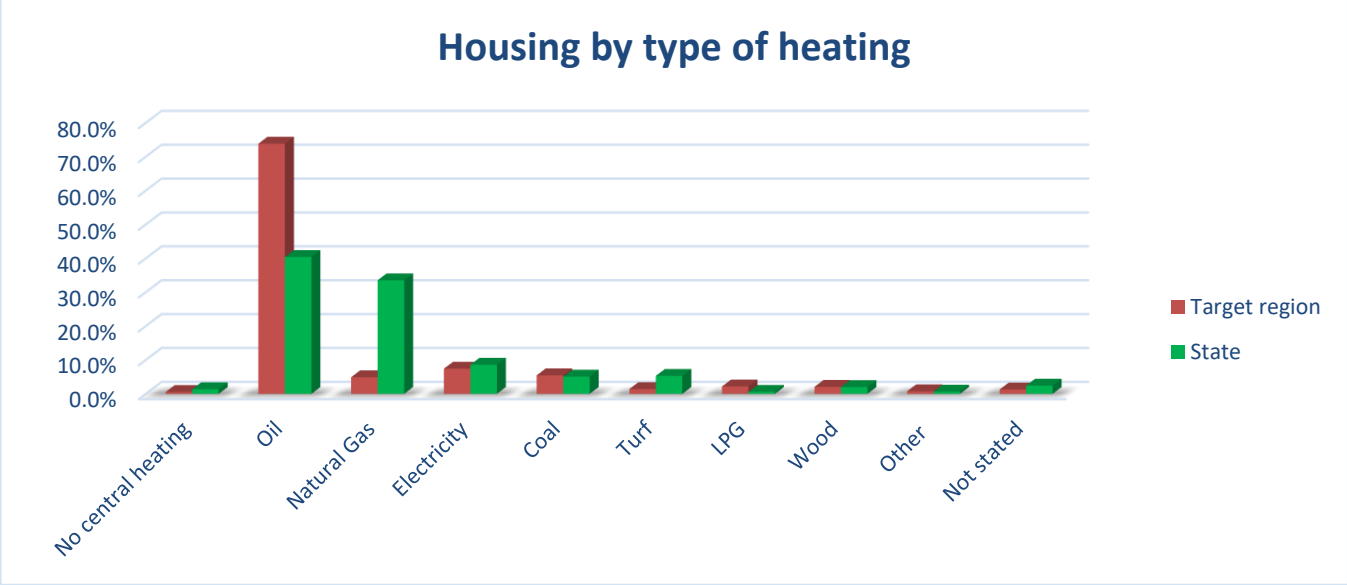


Figure 5-2 Private Households by Central Heating

5.2 Opportunities

The key opportunities for home energy improvements are listed in Table 5-3, which includes typical costs and % savings. The table also suggest the priority homes for each measure:

Opportunities – Home energy					
Opportunity / transition	**Typical investment costs (excl. grants)**	**Consumption reduction/offset for Electrical energy %**	**Consumption reduction/offset for Thermal energy %**	**Priority homes**	**Notes**
Get a BER	€200	0%	0%	Homes without current BER	Supports informed investment. Required as part of most grant schemes. Can be used to help plan community wide projects.
Attic insulation	€1,000	0%	10%	Homes built pre 2006, with less than 100mm insulation	Increase to a total insulation depth of 300mm or more. Include water tank and pipe lagging. Ventilation space at eaves to be maintained.
Cavity wall insulation (CWI)	€1,200	0%	15%	Homes built pre 1990, with no cavity insulation	Non-intrusive. Can be completed in 1 day. Ventilation to be assessed and upgraded to Part F standard.
Internal wall insulation (IWI)	€10,000	0%	20%	Homes built pre 1960, with no wall insulation	More intrusive. Requires moving building services.
External wall insulation (EWI)	€15,000	0%	20%	Homes built pre 2006	Non-intrusive. Ventilation to be assessed and upgraded to Part F standard.
External door replacement	€4,000	0%	5%	Homes with old/single glazed doors	New doors must achieve U-values as per SEAI guidelines. Payback can be in excess of 20 years.
Window replacement	€20,000	0%	15%	Homes with single glazing.	New doors must achieve U-values as per SEAI guidelines. Payback can be in excess of 20 years.
Heating controls upgrade	€1,500	0%	20%	Homes with no heating zones	Separate 'zones' for space heating and hot water, with boiler interlock and programmable control as a minimum.
Condensing oil boiler	€3,000	0%	20%	Homes with standard oil boilers	Min seasonal efficiency > 95%. Consider transition to heat pumps.
Open fireplaces – fit a solid fuel stove	€1,500	0%	15%	Homes with open fireplaces	Include Carbon Monoxide sensors.

Opportunities – Home energy					
Opportunity / transition	**Typical investment costs (excl. grants)**	**Consumption reduction/offset for Electrical energy %**	**Consumption reduction/offset for Thermal energy %**	**Priority homes**	**Notes**
Air to Water Heat Pump	€11,000	+40%	80%	Selected housing - e.g. min C2 BER	Removes fossil fuel boiler demand. Solid fuel stoves may be retained for supplementary heating. Home must have high level of insulation and air tightness prior to heat pump installation. Will increase electrical demand due to change from fossil fuel to electric (heat pump) heating.
Ventilation & Air tightness works	€3,000	-5%	10%	Homes receiving a Heat Pump	Example - Demand Control Ventilation (DCV) with sealing and draught stripping at doors and windows. This is generally included in Deep Retrofit works.
Solar thermal hot water system	€4,500	0%	10%	Selected housing - south facing roof, daily hot water use	Can provide up to 60% of annual hot water demand.
Solar PV	€6,000	15%	0%	Selected housing - south facing roof, daytime occupancy	A 2kW system can provide c. 1500 kWh/year.
Solar PV with battery storage	€9,000	25%	0%	Selected housing - south facing roof, daily occupancy	
LED lighting	€200	30%	0%	Homes with no LED lighting	Simple measure which can be DIY.
Switch from coal to local wood fuel supply	€0	0%	0%	Homes with solid fuel stoves and room for bulk deliveries	Improved impact for the local economy. Reduction of CO2 emissions and air pollution.
Draught proofing DIY	€150	0%	5%	All homes	Simple measure which can be DIY.
Open fireplaces – install a chimney blocker	€30	0%	2%	Homes with open fireplaces not used regularly	Simple measure which can be DIY.
Deep retrofit	€50,000	-50%	95%		Reduces total heat required. Removes fossil fuel boiler demand. Solid fuel stoves may be retained for supplementary heating. Will increase electrical demand due to change from fossil fuel to electric (heat pump) heating. Solar PV can offset some of the electrical demand.

Table 5-3 Opportunities – Home energy

5.2.1 ENERGY SAVINGS MEASURES

Homeowners can take certain measures to improve your BER and in turn reduce their annual energy bill. Using Global Green's Retrofit tool, two main scenarios of energy retrofit measures deployment in the local housing stock have been modelled to assess their impact in energy, CO_2 and financial terms as follows:

- Medium Retrofit – this scenario focuses on improving the fabric performance of the stock, aimed at delivering cost-effective energy savings. This scenario includes:
    - Providing energy efficient LED lighting
    - Installing draught stripping around doors and attic hatch
    - Insulating the hot water cylinder and pipework
    - Installing modern heating controls (3 Zones)
    - Replacement of single glazed windows with double glazing/ Installing advanced energy efficient glazing
    - Pumped insulation to cavity walls
    - Insulating attics (min. 300mm mineral wool)
    - Replacement of open fires with wood stoves
    - Improving building air tightness & upgrading ventilation to Part F requirements

- Deep Retrofit - A scenario that builds on the further fabric improvements and the switch to renewable energy supply:
    - External wall insulation to pumped cavity walls & solid walls
    - Drylining sloped ceilings
    - Replacing windows and doors with triple glazed units
    - Further improvements to fabric airtightness
    - Installing mechanical heat recovery ventilation (MHRV)
    - Installing Air to Water heat pumps for heat provision.

For the most part, the measures are designed to be additive, i.e. a home that has received a medium retrofit can receive a deep retrofit later to achieve further energy savings without abortive work, the exception to this is triple glazing however this could be installed over the natural replacement cycle of the windows. Costs and carbon savings are calculated from a baseline of the current stock.

The provision of Solar PV systems on housing should also be considered as a retrofit measure, where it is appropriate for the resident of the home. Table 5-3 provides an estimate for the full residential sector in the EMP Study Area. Table 5-3 provides an estimate of the impacts per home retrofitted to the Medium and Deep scenarios.

Energy Retrofit Scenario	Capital Cost (€)	Energy Saving (kWh)	Cost Saving (€/year)	CO2 avoided (tonnes/year)
Medium	8,746,399	9,267,375	€675,683	2835
Deep	31,853,956	20,710,044	€1,509,967	12,679

Table 5-4 Potential energy reduction for the Residential sector

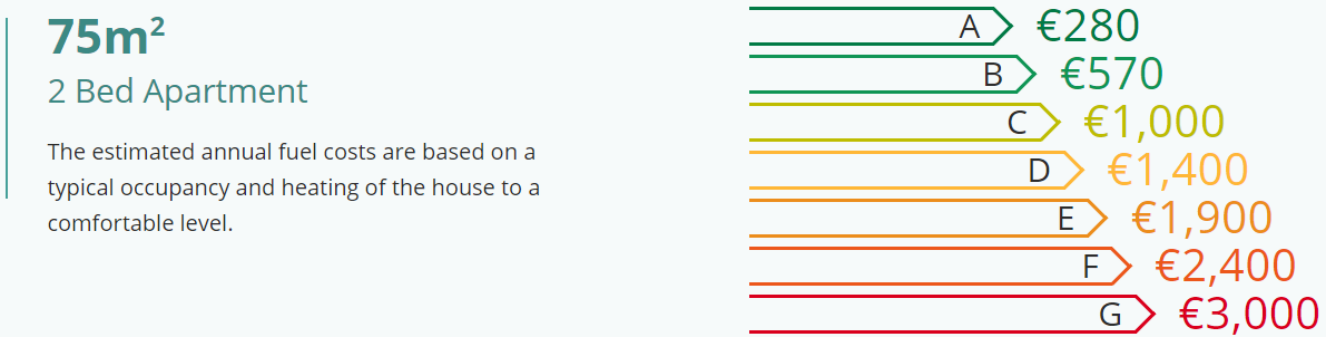
The potential demand reduction was calculated from the housing stock in the study area. From the CSO Data and calculations the figures were worked out for the full study area. The figures and are based on 914 occupied houses.

5.2.2 IMPROVING YOUR BER

BER stands for Building Energy Rating, and is a rating given to your home (or any building) based on the overall energy efficiency of the building on a scale of A to G, with A1 being the most energy efficient rating you can get. It indicates the level of carbon dioxide emissions for the home at the time of certification. Obviously, most homes should aim to have the closest rating to A1 as possible as A-rated homes are the most energy efficient and will have the lowest energy bills.

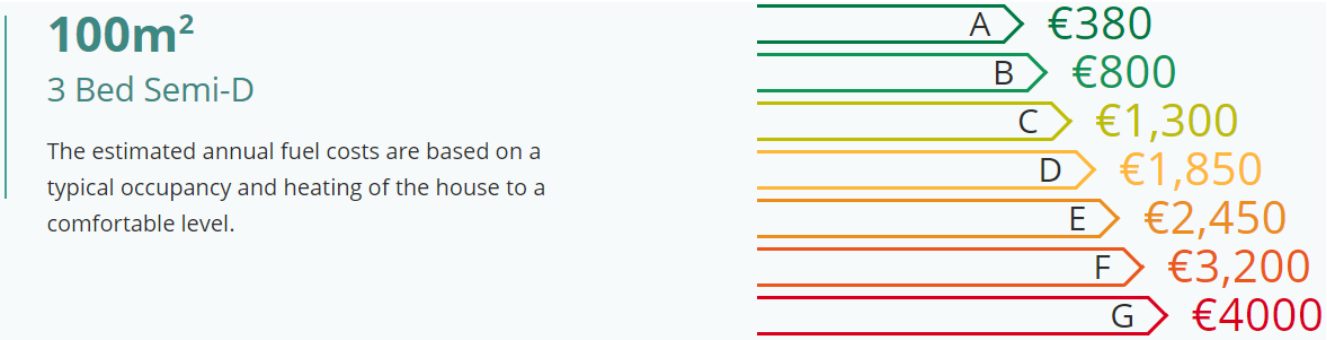
If you want to reduce energy costs, sell or rent a house, a BER will help you plan the best energy improvements. Your BER is calculated through energy use for space and hot water heating, ventilation, and lighting. The number of people likely to occupy a building is also taken in consideration. This is based on the average number of occupants in buildings of a similar size.

The BER is based on the *"calculated energy performance and associated carbon dioxide emissions for the provision of space heating, ventilation, water heating and lighting under standardised operating conditions"* *source: SEAI – February 2022. The difference in energy bills for improving BERs is shown in Fig 5-3.



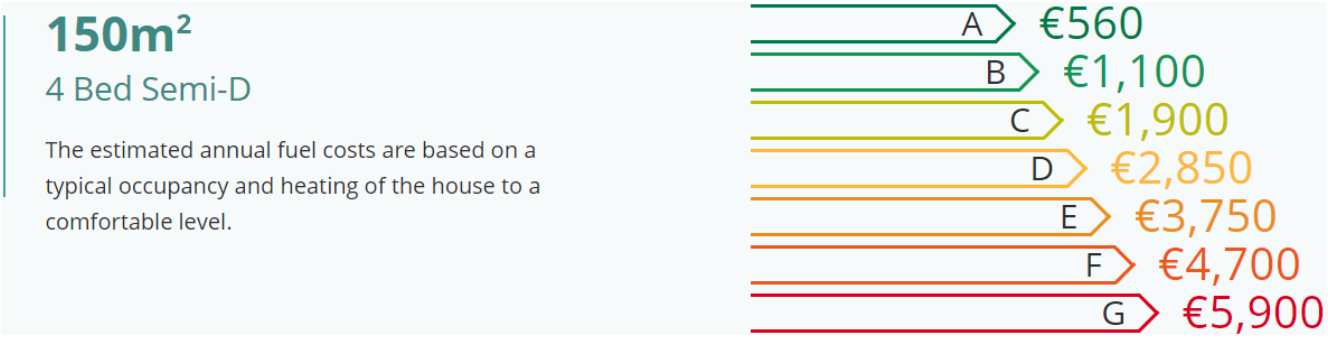
* Based on supplier price increases in the latter half of 2022 the estimated energy costs for each BER rating are as follows:

A: €420
B: €855
C: €1,500
D: €2,100
E: €2,850
F: €3,600
G: €4,200



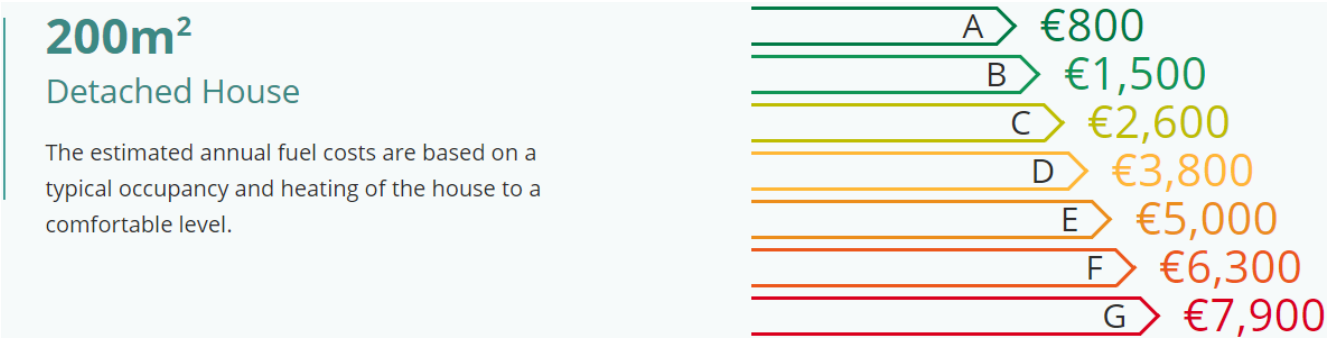
* Based on supplier price increases in the latter half of 2022 the estimated energy costs for each BER rating are as follows:

A: €570
B: €1,200
C: €1,950
D: €2,775
E: €3,675
F: €4,800
G: €5,600



* Based on supplier price increases in the latter half of 2022 the estimated energy costs for each BER rating are as follows:

A: €840
B: €1,650
C: €2,850
D: €4,275
E: €5,625
F: €6,580



G: €7,670* Based on supplier price increases in the latter half of 2022 the estimated energy costs for each BER rating are as follows:

A: €1,200
B: €2,250
C: €3,900
D: €5,320
E: €6,500
F: €8,190
G: €10,270

Figure 5-3 What difference does a BER mak* Based on supplier price increases in the latter half of 2022 the estimated energy costs for each BER rating are as follows:

A: €1,650
B: €3,450
C: €5,070
D: €7,345
E: €8,940
F: €11,400
G: €14,280

5.2.3 SUPPORTS FOR HOME ENERGY UPGRADES

5.2.3.1 SEAI ONE STOP SHOP

One Stop Shops offer homeowners all the services required for a complete home energy upgrade. These registered private operators will manage the entire process for you, from the initial assessment of your home, through to the final BER.

- Fully managed solution
- Wider range of grants
- Grant values deducted from the cost of works upfront

Less disruptionA One Stop Shop will manage your entire home energy upgrade. They offer a full range of services including:

Home Energy Assessment

A technical surveyor will advise on the best upgrades to bring your home to a B2 energy rating or higher.

Grant Application

They will apply and accept all SEAI grants for your project and deduct the values upfront from the cost of your works.

Project Management

They will manage all the works at your home and ensure quality checks are carried out.

Contractor Works

They will assign a contractor to carry out the works on your home.

Follow up BER

A registered BER Assessor will complete your post-works BER assessment and publish the certificate[1]

Finance Options

Some One Stop Shops can offer you finance options through their finance partners.

[1] https://www.seai.ie/register-with-seai/one-stop-shop/National_Home_Energy_Upgrade_Scheme_-_Homeowner_Guide[1].pdf

5.2.3.1.1 WHO CAN USE A ONE STOP SHOP

The One Stop Shop service is available to homeowners and non-corporate landlords whose property or home meets these criteria:

- Was built and occupied before 2011 for insulation and heating controls
- Was built and occupied before 2011 for renewable systems grants
- Has an existing BER of B3 or lower and must achieve a minimum rating of B2 on work completion, with a 100kWh/m2/year or better improvement on the BER primary energy value
- Has not previously received grants for the same home energy upgrades

Approved Housing Bodies are also eligible for the scheme but the grant amounts available are different. For full information on the SEAI One Stop Shop please visit: https://www.seai.ie/grants/home-energy-grants/one-stop-shop/

5.2.3.2 SEAI'S WARMER HOMES

SEAI's Warmer Homes scheme provides free energy upgrade services (attic insulation, cavity wall insulation, draught proofing, energy efficient lightbulbs) to vulnerable **energy poor homeowners**.

'Energy Poor' Homeowners – homes built before 2006 – in receipt of one of the following:

- Fuel Allowance as part of the National Fuel Scheme.
- Job Seekers Allowance for over six months and have a child under seven years of age
- Working Family Payment
- One-Parent Family Payment
- Domiciliary Care Allowance
- Carers Allowance and live with the person you are caring for

Upgrades Offered

An SEAI surveyor will recommend upgrades that are suitable for your property. These will be based on factors such as its age, size, existing heating system and condition. Upgrades offered under the scheme include:

- Attic insulation
- Cavity wall insulation
- External wall insulation
- Internal wall insulation

- Secondary work such as lagging jackets, draught proofing and energy efficient lighting
- New heating systems and windows are occasionally recommended

Who can apply?

You need to meet these 4 criteria to apply for the Free Energy Upgrade Scheme.

Criteria	Description
1. You must own and live in your own home	This must be your main residence, where you live most days of the week
2. Your home was built and occupied before 2006	This means the ESB meter was connected and property lived in prior to 2006
3. You receive one of the following welfare payments	• Fuel Allowance as part of the National Fuel Scheme. • Job Seekers Allowance for over six months and have a child under seven years of age • Working Family Payment • One-Parent Family Payment • Domiciliary Care Allowance Carers Allowance and live with the person you are caring for
4. You have not previously received works under the scheme	SEAI carry out one visit per home. This may be reviewed in future rollouts of the programme.

More info: https://www.seai.ie/grants/home-energy-grants/free-upgrades-for-eligible-homes/

5.2.4 SEAI'S BETTER ENERGY COMMUNITY (BEC) ALSO KNOWN AS COMMUNITY GRANT

SEAI's Better Energy Community programme offers significant funding for domestic and non-domestic community-based projects. Further details on the programme and its potential for the realisation of the Strandhill SEC Energy Master Plan will be provided later in this report. For illustration purposes, the case study project above would attract 30% Community Energy Grant funding for the medium retrofit and 50% funding for the deep retrofit.

5.2.5 HOMEOWNER FINANCE

An option to help homeowners with the initial cost of the home investment are Credit Union loans designed specifically for home energy upgrades. An example of a Credit Union which offers a specific home energy loan at 6.36% APR. Table 5-4 outlines how this can facilitate the cost of the upgrade.

Example of homeowner finance options – 4-year loan at 6.36% APR.							
Total Cost per home	**Grant @ 35%**	**Net cost per home**	**Deposit**	**Loan amount**	**Monthly repayment (4-year loan)**	**Annual energy savings**	**Net savings over 4 years**
€15,000	€5,250	€9,750	€5,000	€4,750	€112	€800	€2,574
€20,000	€7,000	€13,000	€6,000	€7,000	€166	€1,000	€3,032
€30,000	€10,500	€19,500	€8,000	€11,500	€272	€1,200	€3,244
€35,000	€12,250	€22,750	€10,000	€12,750	€302	€1,400	€3,854

Table 5-5 Example of homeowner finance options – 4-year loan at 6.36% APR

6 Energy in Transport

6.1 Baseline Energy Usage

The work involved analysing CSO Data for the EMP Study Area. The CSO data gave accurate information on amount of energy used, types of vehicles and annual mileage. It also created awareness of the benefits of transport fuel savings, the government grants available, with the aim of saving transport businesses' money and spurring economic activity in the community. The key opportunities for reducing the environmental impact of transport are illustrated in Fig 6-1 and further details are presented in the following sections.


Cycling & Walking


Public transport


Car sharing


Electric vehicles

Figure 6-1 Reducing the environmental impact of transport

The energy usage figures below cover both business and private use.

Consumption (kWh)	Total Transport Energy Spend (€)	Carbon Emissions (toness Co2/annum)
13,833,409	€2,496,479	4,780

Table 6-1 Transport Baseline Energy Usage

The CSO Census data includes several datasets for the local electoral areas that describe how people get to work, how long they have to travel for and how many cars each household owns. Figures 6-2 and 6-3 present the principal data on which this analysis is based.

The transport spend per car owner is circa €1,263, 9,687kWh.

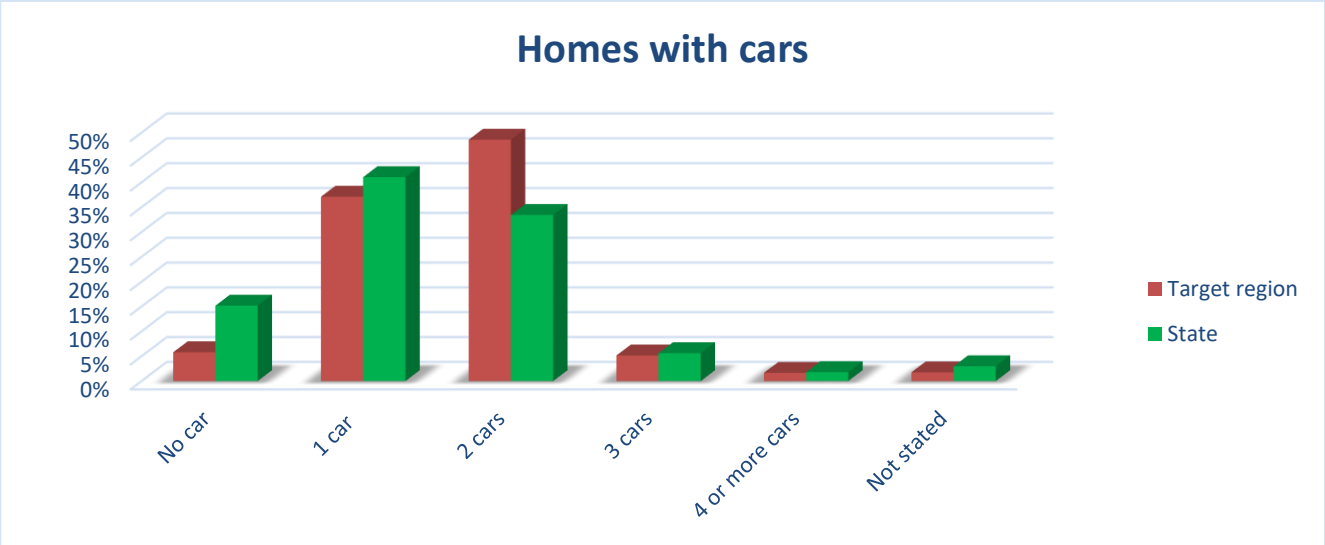


Figure 6-2 Number of households with cars

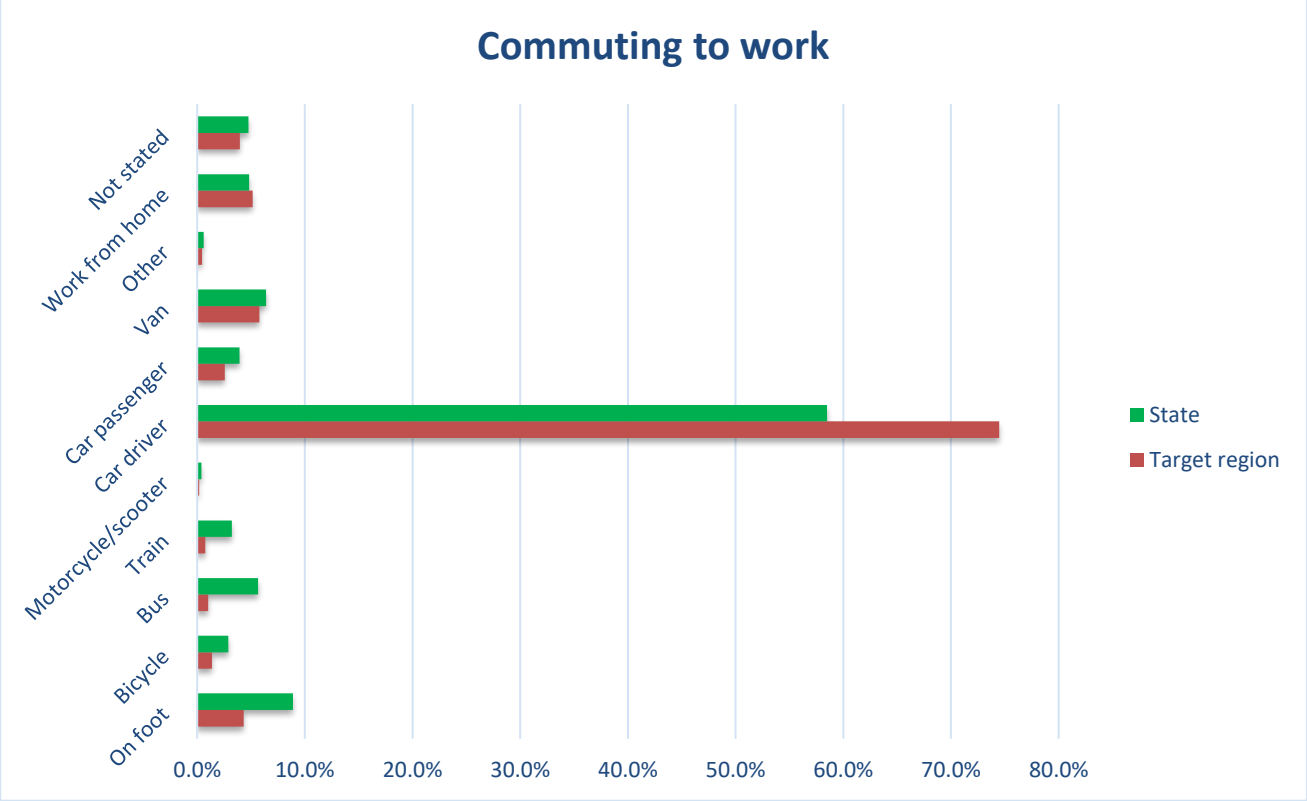


Figure 6-3 Population aged 5 years and over by means of travel to work, school, college

This data shows that 58% of commuting journeys are done by car, while low-carbon options such as walking and public transport account for less than 6%. Commuting times data confirm that people in the local area generally travel significant distances to go to work, to places of employment such as neighboring counties.

Our modelling converts commute length from time to kilometers assuming an average speed of 60 km per hour. Based on the CSO data we assume 75% of all journeys are made by car. An additional 20% is added to the result of this analysis to account for non-commuting car use.
The final estimate indicates that car use (17,600km/car/annum) is higher than the national average (17,300km/car/annum) as presented by the CSO's Transport Omnibus (2015).

6.2 Potential Energy Demand Reduction

Energy Saving (kWh)	Cost Saving (€)	Carbon Saving (tonnes CO2/annum)
2,785,964	€335,313	638

Table 6-2 Transport Potential Energy Demand Reduction

Potential demand reduction is based on reduction in car use firstly through car sharing, improving eco-driving, vehicle telematics, using public transport where possible. The next areas then are based on having more efficient vehicles like hybrids and electric vehicles. The annual saving per motorist is circa €261, 2,150kWh.

Energy use for transport represents a large proportion of the total energy use at national level, just as in this local area, but is often ignored in energy planning because it is perceived as a problem too difficult to tackle. However, we would like to explore two measures that could make a significant impact in Strandhill SEC's transport energy usage.

6.2.1 ENCOURAGING WALKING AND CYCLING – UPGRADE OF "CYCLEBUS" ROUTES

It is notable that Strandhill SEC has a lower proportion of residents commuting by foot than the national average. It is likely that there are many reasons for this including the rural nature of the area. However, this statistic does highlight potential for improvement.

Cycling as a means of commuting has grown across the country. Strandhill National School (St. Asicus) Parents Association (with the help of Sligo Cycle Campaign) initiated a "CycleBus" to encourage children to cycle to school. A cyclebus consists of several adults cycle alongside students to ensure they get to school safely. Normally there is one adult leading out at the front, one at the back and one (or more) cycling between motor traffic and the line of children. This has proven to be very popular and is borne out by the number of older school kids that now cycle daily.

On the back of the success of the school bus and the need to invest in active travel (AT) Sligo Co. Co has commissioned an options study report into a redesign the cycle infrastructure in Strandhill village to facilitate a safer cycling environment for all. The options will be presented to the National Transport

Authority (NTA) who will decide on whether funding is allocated. There could be scope to liaise with the Safe Route to School (SRTS) programme to help bring about more active travel in the village.

6.2.2 UPGRADE OF THE "STRANDHILL GREENWAY" (R292) TO A SEGREGATED CYCLE PATH

As part of Strandhill SEC efforts to reduce its transport emissions more initiatives need to be explored to encourage active travel. An opportunity exists to safely connect Strandhill to Sligo Town for cyclists through the redesign of the R292. At present there is no segregation (only painted lines) between live traffic and cyclists. Figure 6-4 shows a typical section with dashed and solid lines indication cycle lanes.

Figure 6-4 Typical Road layout along the R292

By incorporating segregated cycle infrastructure, commuter, families (young and old) and tourists could travel between the two urban centers in a septate lane to live motor traffic. As has been proven in other parts of Ireland, Europe and globally, by offering safer cycle infrastructure more and more people will make a modal shift from car to bicycle/electric bike.

Figure 6-5 is taken from the most recent Ordnance Survey (5th edition) and shows that the R292 has recently been designated as "Strandhill Greenway" The National Transport Authority's (NTA) Cycle Connects programme defines a Greenway as an "off-road cycle route with no adjacent traffic". However, the Cycle Connect's 2022 consultation process on classifies it as an "inter-urban" road stating that it has "potential to provide off-road/segregated routes parallel to the existing road in later years"

Figure 6-5 Ordnance Survey (5th edition) showing the "Strandhill Greenway"

Strandhill SEC should work with their partners (Sligo Co. Co., Sligo Cycle Campaign, NTA etc.) to bring about the upgrade of this route to a greenway standard as defined above. There is a strong case to provide off-road/segregated routes parallel to on the R292 in the near future. There are some obstacles to this, mainly that the route is categorized as inter-urban (urban streets are prioritized). However, there exists a stronger environmental, economic and health argument for its construction. Strandhill is the third largest urban centre in Co. Sligo, attracts large number of visitors each year and has traffic congestion problems.

Also, unlike many of the roads in the region, there exists ample road width for most of the route to facilitate the installation segregation. A suggested typical design is shown in Figure 6-6.

Figure 6-6 Example of a physical bollard between motor traffic and cyclists (image courtesy: IrishCycle.com)

The community could start by promoting the use of the sections of the "old road" between Strandhill to Scarden GAA center of excellence. Figure 6-7 shows sections of the "old road", behind Church of Ireland (left) and (right) Scarden (beside graveyard).

Figure 6-7 sections of the "old road", behind Church of Ireland (left) and (right) Scarden (beside graveyard)

Figure 6-8 and Figure 6-9 show rough sketches of sections of the "old road", behind Church of Ireland rough sketch (red) and in vicinity of the graveyard where the main road could be avoided.

Figure 6-8 sections of the "old road", behind Church of Ireland

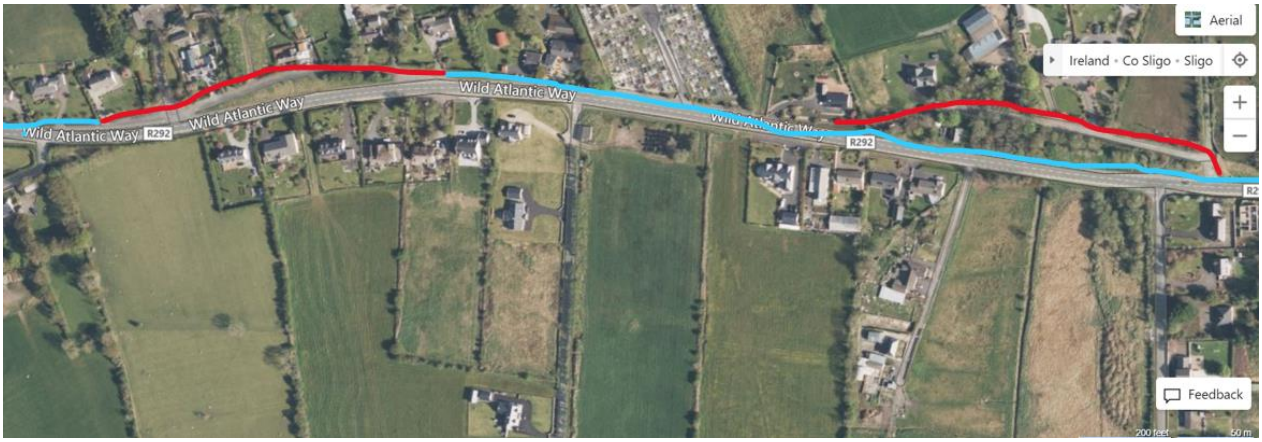


Figure 6-9 rough sketch (red) of potential "off road" routes in vicinity of the graveyard (main road option in light blue)

Funding should be sought to carry out a feasibility study to include options for re-design of the road layout, cost-benefit analysis, CO2 reductions and health improvements etc. A public survey should be conducted to gauge support for the proposal.

Eco Driving - Car Fuel Saving

Direct Fuel Savings from being more aware and slight change in driving behaviour. The scale of savings depends on details such as the vehicles you operate, the duties they perform, and most importantly how the drivers currently drive. On average 15% savings can be achieved.

- Shift up early to a higher gear - Driving at lower revs reduces fuel consumption so change up a gear at around 2,000 RPM.
- Switch off your engine - Many newer cars automatically turn off when stationary in neutral. If yours doesn't, turn off your engine when you've stopped for a minute or so to save fuel.
- Slow down - Your fuel costs will increase the faster you drive so keep speeds reasonable.
- Windows vs air conditioning - It is more fuel efficient to open the window over using air-conditioning when driving. Air conditioning can increase your fuel consumption by as much as 5%. However, we appreciate that open windows are not always pleasant on extremely hot days or at higher speeds, so to save fuel, if you do use air-con, try to use it sparingly.
- Tyre pressures - Under-inflated tyres increase your fuel consumption and can be dangerous on the road so check them once a month and before long journeys. For correct tyre pressure (acc. to loading, highest pressure and speed driven), check with your car's manual.
- Roof racks/boxes - Having these attached to your car when they're not being used will increase drag and increase your fuel costs.
- Lighten your load – Remove excess items from your car before travelling to reduce weight.

Fuel Efficient Tyres

Roughly 20% of a motor vehicle's fuel consumption is used to overcome rolling resistance of the tyres (IEA, 2005). The amount of rolling resistance is a function of the level of inflation of the tyres and the technical rolling resistance of the tyre material.
Additional fuel is required when tyres are underinflated. In most real-world driving conditions, tyres are underinflated compared to their optimum performance level. Data presented at the IEA Tyre Workshop in 2005 showed that in the European Union, the tyres in service were underinflated by 0.2 to 0.4 bar on average for passenger cars and 0.5 bar for trucks. It is generally understood that these numbers correspond to an increase in energy consumption and CO_2 emissions of roughly 1% to 2.5% for passenger cars, and 1% for trucks. Tyre pressure monitoring systems are a valuable tool for both car safety and fuel economy purposes.
Information is sent to drivers when their tyres need inflation, which encourages better vehicle fuel efficiency. Installing tyre pressure monitoring systems could be expected to improve tyre maintenance and lead to an improvement in the range of 1% to 2% in overall fuel efficiency.

Telematics
In-car technologies especially those giving drivers instant feedback on their driving are also effective and are available from telematics companies, sat nav providers and in some cases from vehicle manufacturers themselves.

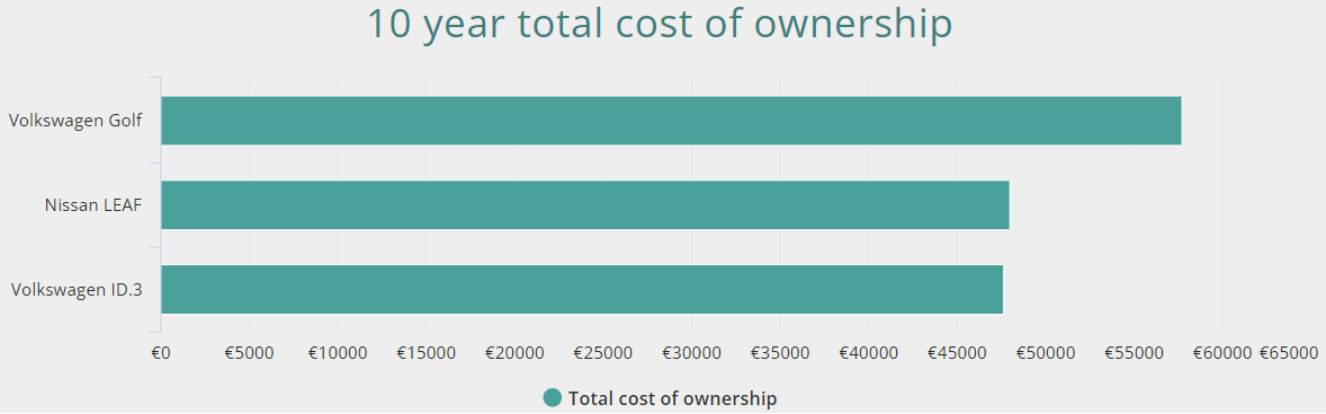
Telematics provide accurate mileage management and can report on the fuel economy of specific vehicles which can help fleets to achieve significant reductions in fuel use and emissions. By having more accurate, vehicle-specific data, a car owner can quickly identify where action needs to be taken, such being more aware of their aware of their driving behavior.

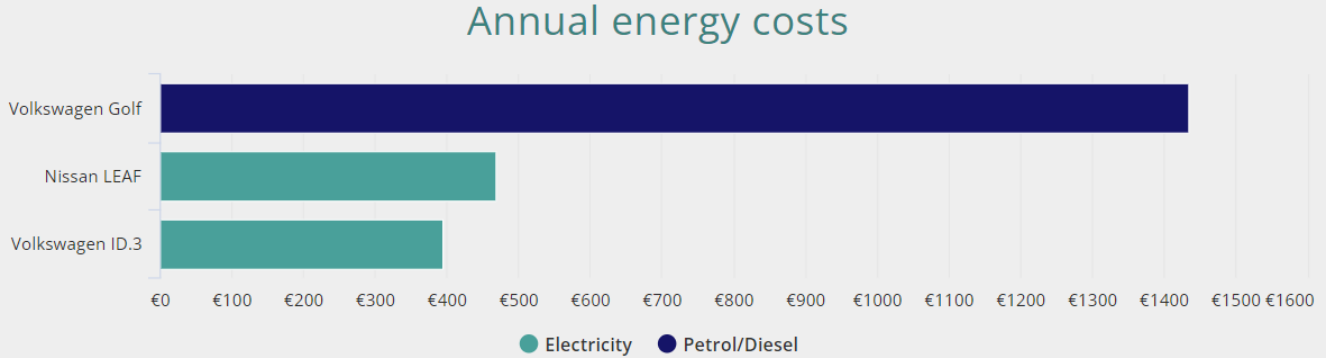
Switching to Electric Vehicles
Manufacturers of Electric Vehicles (EV) now claim ranges above 470km and approaching 250 km for the most popular models. 85% of commutes made in Strandhill SEC are less than 1 hour in duration. EVs consume less energy than internal combustion engines per km travelled, ~0.2kWh/km vs ~0.5kWh/km. Taking this into account we have estimated the potential energy savings delivered by using EVs to complete these journeys as well as the consequent cost and carbon reductions. Switching to EV's could reduce total transport demand in the area by 16%, deliver a 10%
reduction in carbon emissions.

Electric vehicle vs diesel equivalent
The table below presents the results of SEAI's Compare and Calculate tool which allows comparing key performance indicators between recent electrical car models and internal combustion engine equivalents. It assumes an annual mileage of 16,000 km and calculates running costs based on recent fuel prices, including night rate electricity for electrical cars. When the grants available from SEAI and VRT exemption are considered, new electrical cars should have a net purchase cost equal or lower to

their petrol or diesel equivalent. Their significantly lower running costs are therefore a pure bonus, in addition to reducing a household's carbon footprint. For more information on EV models specifications, please visit www.seai.ie/sustainable-solutions/electric-vehicles.

	 Volkswagen Golf 2.0 TDI 115HP Life	 Nissan LEAF Leaf SV 62 kWh	 Volkswagen ID.3 O-Business 145HP 58kWh
FUEL	Diesel	Battery Electric	Battery Electric
TOTAL COST OF OWNERSHIP	€57,720	€47,979	€47,679
PRICE	€34,570	€46,520	€47,060
ANNUAL ENERGY COST	€1,435	€469	€395
ELECTRIC RANGE	N/A	385 km	414 km
TAILPIPE EMISSIONS	110g CO_2/km	0g CO_2/km	0g CO_2/km




Annual energy costs
Volkswagen Golf
Nissan LEAF
Volkswagen ID.3
€0
€100
€200
€300
€400
€500
€600
€700
€800
€900
€1000
€1100
€1200
€1300
€1400
€1500
€1600
Electricity
Petrol/Diesel

* Assumptions

Name	M1
PHEV % Annual Mileage on Electric Only	70%
Price of Petrol Cents/Litre (inc of VAT, Taxes and Duties)	186.9
Price of Diesel Cents/Litre (inc of VAT, Taxes and Duties)	189.8
Unit Price of Electricity (night rate) cents/kWh incl VAT	14.07
Annual Mileage	18,000 km
Vehicle Lifespan	10 years
Annual Maintenance Cost ICE	€700
Annual Maintenance Cost PHEV	€550
Annual Maintenance Cost EV	€350
Electric Range	N/A

To find a local EV dealer, please visit the SEAI database: https://www.seai.ie/technologies/electric-vehicles/buying-an-ev/find-a-dealer/

6.2.3 OPPORTUNITIES AND IMPACT

The key opportunities for transport energy improvements are listed in Table 6-4. Quantitative measurement of impact is complex. A simple measure would be to estimate the number of car journeys avoided and approximate km distances. However, there are several qualitative positive impacts including general health and wellbeing.

Opportunities – Transport energy	
Category	**Opportunity / transition**
Walking & Cycling	Maintain the Strandhill Cycle Bus by organinsing a rota of parents to act as Marshalls
Walking & Cycling	Provide information on appropriate rain gear for walking & cycling
Walking & Cycling	Work with Sligo Co.Co in the design of the potential segregated cycling route in the village
Walking & Cycling	Increase road signage to warn motorists of school cyclists and walkers
Walking & Cycling	Work with Sligo Co. Co in the design of the potential segregated cycling route between Strandhill and Sligo Town, the "Strandhill Greenway".
Walking & Cycling	Provide on-site cycle infrastructure: bike racks, lockers
Public transport	Publicise Local Link and other service routes
Car Sharing	Carry out a community survey of daily commuting destinations and weekend destinations
Car Sharing	Identify and agree parking/pick-up locations
Car Sharing	Hold a local coffee/tea morning to set up a car sharing group
Electric Vehicles	Public EV awareness event with vehicle and charging point suppliers as exhibitors
Electric Vehicles	Establish a local EV users network
Remote working	Working from home – campaign larger employers to allow working from home
Raise awareness	Provide simple guides in relation to eco-driving, fuel efficient tyres etc.

Figure 6-10 Opportunities – Transport energy

6.2.4 FINANCIAL INCENTIVES

The purchase of new electrical vehicles can attract the following financial incentives:

- SEAI offers grants available for a range of eligible private and commercial electric vehicles. The level of grant depends on the purchase cost but is €5,000 for a private electrical car of €20,000 or more, and €3,800 for a commercial vehicle of €18,000 or more.
- Electrical vehicles also receive VRT relief separately to SEAI grant support, as well as reduced Motor Tax of €120.
- A new government funded support scheme has been introduced to assist homeowners install an electric vehicle charge point on their property. The scheme launched in January 2018 and provides a grant up to the value of €600 towards the purchase and installation of a home

charger unit. The applicant must be the owner of an eligible new or second-hand electric vehicle (EV).

- TFI Alternatively Fueled Heavy Duty Vehicle Purchase Grant Scheme - To promote the decarbonisation of the heavy-duty sector and to assist road transport companies to transition from fossil fuels, the Department of Transport has launched a new Alternatively-Fueled Heavy-Duty Vehicle (AFHDV) purchase grant scheme. The AFHDV Grant Scheme will support the purchase of new, non-retrofitted large vans, trucks, buses and coaches with an unladen design gross weight of more than 3.5 tonnes. The Scheme is intended to help bridge the difference in purchase price between conventional heavy-duty vehicles (HDVs) and those powered by alternatively-fueled power-trains that offer environmental benefits over standard diesel vehicle technologies, and that would not otherwise have been bought. Details of the AFHDV Scheme, including terms and conditions, grant eligibility, supported vehicle categories and grant support levels are to be found on the TII website.

For company electrical cars, Revenue also allows for Benefit in Kind exemption.

[2]• https://www.tii.ie/roads-tolling/tolling-information/afhdv-scheme/

7 Community Buildings Energy Profile and Efficiency Opportunities

Specific opportunities are identified in the energy audit reports for a number of buildings within the SEC Area. For the purposes of continuing outreach for the SEC team, some general measures should be promoted for the Non-residential sectors, as outlined in the following sections. Local organisations that are interested in energy upgrades could then be included in community wide projects such as those supported by the Communities Energy Grant (formerly Better Energy Communities).

The following is the Summary of opportunities for local Primary School:

Action	Energy saving per yr (€)	Emissions reduction per yr (t CO_2e)	Cost of action (€)	Payback period (years)	First step
Develop and implement energy awareness campaign to assist staff in reducing idle times on electricity users in the business and manage electricity usage more efficiently.	499	0.62	0	0	Energy Academy
Develop and implement energy awareness campaign to assist staff in reducing thermal energy usage in the business and manage thermal usage more efficiently.	580	1.77	0	0	Energy Academy
Roof insulation upgrade	454	1.38	6600	14.5	Communities grant
Wall insulation upgrade for exterior walls	1395	4.24	31240	22.4	Communities grant

Window upgrades	1310	4.00	71680	54.7	Communities grant
Door air curtain for main student entrance door	580	1.77	1900	3.3	Communities grant
Lighting upgrade to LED	1326	1.66	3870	2.9	Energy Efficiency Obligation Scheme (EEOS)
Install a multi-channel programmer, weather compensated controls (in the boiler house), and wireless wall thermostats should be installed.	580	1.77	2000	3.4	Communities grant
Roof mounted Solar PV System	499	0.62	2280	4.6	Communities grant
Total	**€ 7,223**	**17.83**	**€ 119,570**		

The following is the Summary of opportunities for Enterprise Centre:

Action	Energy saving per yr (€)	Emissions reduction per yr (t CO_2e)	Cost of action (€)	Payback period (years)	First step
Develop and implement energy awareness campaign to assist staff in reducing idle times on electricity users in the business and manage electricity usage more efficiently.	211	0.27	0	0	Energy Academy

Develop and implement energy awareness campaign to assist staff in reducing thermal energy usage in the business and manage thermal usage more efficiently.	224	0.77	0	0	Energy Academy
Implement Electricity Energy performance Indicator for the business.	352	0.46	0	0	Energy Management Training
Implement Thermal Energy performance Indicator for the business.	224	0.77	0	0	Energy Management Training
Install energy monitoring software system.	704	0.91	4000	5.7	Communities grant
Roof insulation upgrade for 1st floor attic	192	0.66	2100	10.9	Communities grant
Wall insulation upgrade	46	0.16	930	20.2	Communities grant
Door air curtain for reception entrance door	360	1.23	1900	5.3	Communities grant
Lighting upgrade to LE	2048	2.67	9090	4.4	Energy Efficiency Obligation Scheme (EEOS)

Upgrade of boiler to an Air to Water Heat Pump for Strand Campus Offices	1152	15.39	18000	15.6	Communities grant
Mechanical ventilation heat recovery (MVHR) for Strand Campus Office Building	900	3.08	12000	13.3	Communities grant
Install Solar PV System on Strand Campus Office Building	2816	3.66	13110	4.7	Communities grant
Total	**€ 9,229**	**30.02**	**€ 61,130**		

7.1 Energy understanding and management

A key opportunity for many organisations is to establish an energy management system which will facilitate better understanding, in order for informed upgrades and initiatives to be planned. This can be initiated by creating an in-house energy champion to develop an internal energy management system. A simple starting approach could include:

- Keeping an energy file with all bills and reviewing this on a quarterly basis
- Changing electricity supplier every year
- Checking oil prices and ordering when they drop
- Checking the settings on Thermostatic Radiator Valves (TRVs)
- Carrying out a daily and weekend shutdown of all heating and unnecessary electrical items
- Checking all windows are closed at the end of the day

7.1.1 FABRIC UPGRADES

Attic and wall insulation can be a very easy measure to complete and result in a quick payback period. Heat is lost from the interior of a building in two main ways: by transfer through the materials that make up the external envelope of the building (measured as a U-value) or by the exchange of air between the interior and the exterior environment that is, ventilation. It is estimated that typical heat losses from a building are as follows:

- Walls 35%
- Roofs 25%
- Floors 15%
- Draughts 15%
- Windows 10%

Heat loss is a major issue for nearly all buildings, especially as they tend to be quite high-volume buildings.

7.1.2 LED LIGHTING UPGRADES

Many enterprises have yet to implement a full conversion to LED lighting. This energy efficiency measure provides easily calculated and reliable energy savings with short paybacks (<2 Years), especially for businesses operating 5-6 days/week with long evening or night time hours.

7.1.3 SOLAR PV

Due to the lowering costs of the technology in the last decade, Solar PV has become a cost-effective measure for many buildings. The most cost-effective use of Solar PV is to use the electricity generated in the owners building. In particular, 5-6 day business that have a continuous base load of electricity demand will receive meaningful savings from a Solar PV system. Solar PV is low maintenance, generally aesthetic and yet visible enough to promote a 'green' or 'eco-friendly' image for small businesses.

The objective would be to support the installation of appropriately sized Solar PV systems (up to micro-generation levels) designed primarily for self-consumption. This would typically be:

- Single phase, 6kW output
- 3-phase, 11kW output

Each Non-Domestic energy efficiency and renewable opportunity is detailed in the reports completed for each business/community building and organisation which is relative to their operations and for that reason the information is confidential

8 Medium to Large Scale Renewable Energy Community Projects

Reference to on-site renewable energy opportunities has been made in previous sections of this document. These have included heat pumps, biomass heating and Solar PV. This section of the Energy Master Plan refers to the opportunities for larger scale, grid connected, renewable energy projects in the SEC study area.

8.1 Wind Energy

The SEC study area and adjacent areas have many suitable locations for wind and solar energy. For any grid scale projects, proximity to designated areas such as Special Areas of Conservation (SACs) must be considered. The largest challenge to a grid scale wind energy project is likely to be planning permission and community trust.

The size and scale of a potential wind farm in the SEC study area would be dependent on the land available to the project. As an example, a relatively small wind farm consisting of 2No. 2.3MW turbines (e.g. Enercon E-92) would provide an annual energy yield in the region of 12 GWh, as illustrated below. This is comparable to the Templederry Wind Farm, which is the first 100% community owned wind energy project in Ireland.

Turbine Power Rating (PT)	2.3
Number of Turbines (NT)	2
Total Turbine Farm Power (PWF)	4.6
Capacity Factor (F)	30%
Annual Hours	8760
Annual Rated Hours	2,628
Annual Energy Yield (GWh)	12
Annual Energy Yield (MWh)	12,089
Annual Energy Yield (kWh)	12,088,800
Circa Annual Energy Yield (€)	€604,440
*Circa Project Cost	€8,229,884
Simple Payback (Years)	13.6

* For reference, typically the actual wind turbine costs around 69% of the total project cost.

Even in an increased demand scenario, e.g. transition to heat pumps and increased EV use, this scale of project has the potential to provide multiples of the total electrical demand for the SEC study area.

There is a Toolkit available from SEAI to provide guidance and support to communities interested in developing renewable electricity generation projects in Ireland through the Renewable Electricity Support Scheme (RESS). Please click on the following link to access the Toolkit for Onshore Wind Energy: https://www.seai.ie/publications/Community-Toolkit-Onshore-Wind.pdf

8.2 Solar Energy

Solar PV farms are generally less contentious for planning and community engagement. This is largely due to the lower visual impact and less construction and noise issues. Grid scale Solar PV farms tend to have installed capacities of 5MW and upwards. This would require approx. 10 – 12 hectares (25 – 30 acres) of land. Fig 8-2 illustrates the monthly energy output for a 5MW Solar PV farm in the SEC study area.

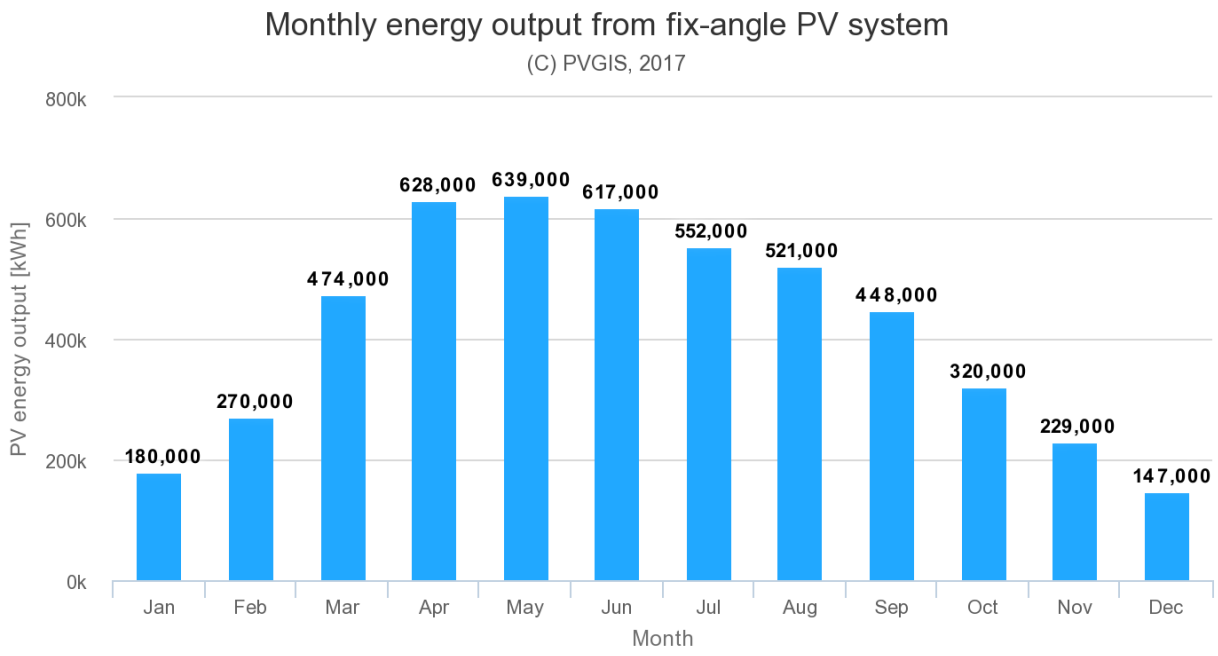


Figure 8-1 Annual energy yield calculation for 5MW solar farm

A 5MW Solar PV farm would provide an annual energy yield in the region of 4.3 GWh. This is comparable in scale to the Southill Community Solar farm.

Opportunities exist to collaborate on Solar PV installations with large energy users and utilities companies in Strandhill e.g.the Irish water treatment plant.

A Solar PV Toolkit has been developed by SEAI to provide step-by-step guidance through the process of developing a Solar PV energy project, from determining your goals, to helping you achieve them. Please click on the following link to access the Toolkit for Solar PV:https://www.seai.ie/publications/Community-Toolkit-Solar-PV.pdf

8.3 Marine Energy

The whole area of offshore renewable energy (ORE) is vital to Ireland's emissions targets, with numerous offshore wind projects in the pipeline, see Figure 8-2

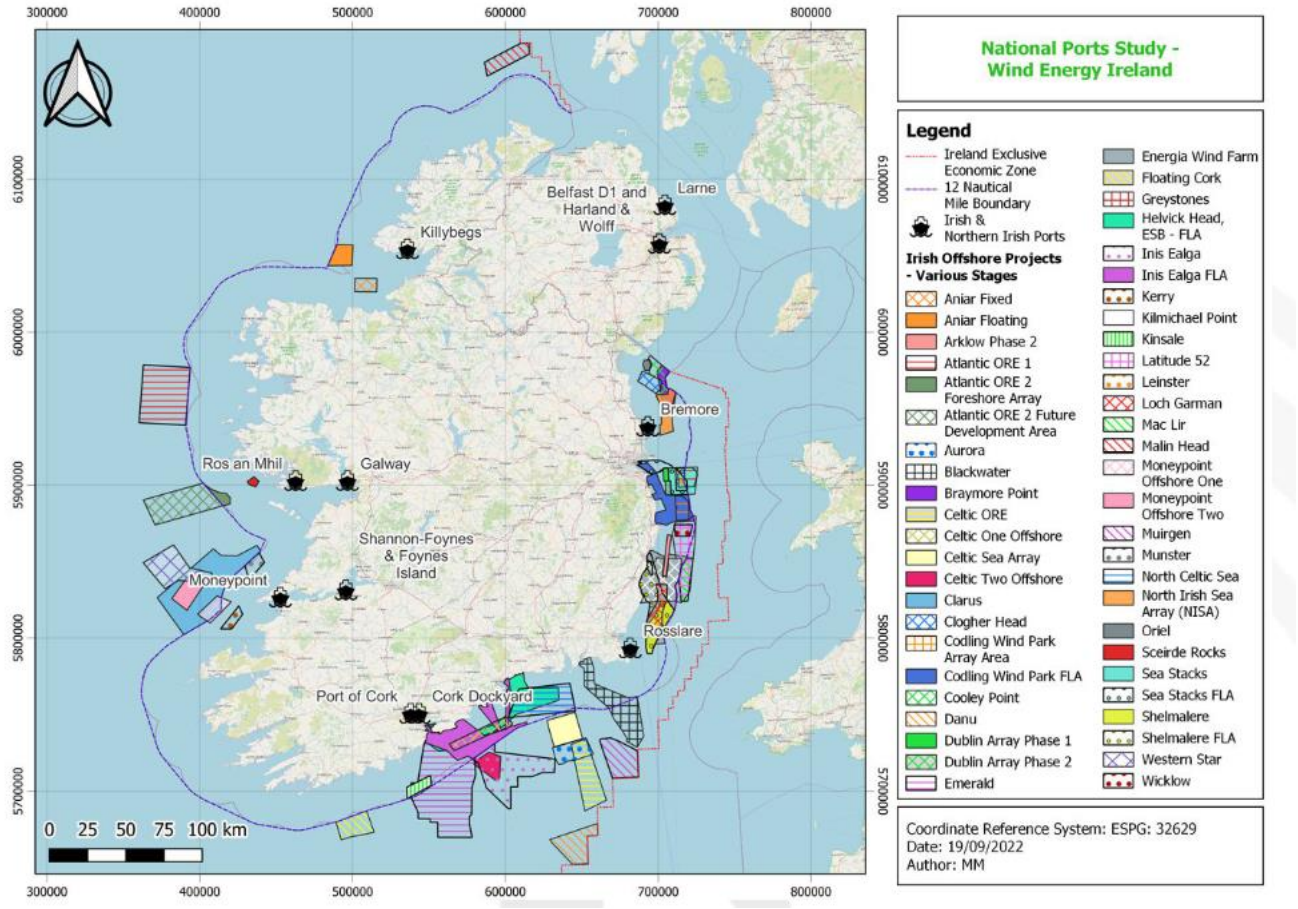


Figure 8-2 Proposed offshore wind sites in Irish waters (WEI/GDG)

Rapid developments in floating foundation technology are creating new markets, where floating foundations are being deployed in waters from circa 60 m to 1000 m deep. Floating Offshore Wind (FLOW) has great potential in the Celtic Sea and the Atlantic Ocean Ireland can be a world leader in producing renewable energy and green Hydrogen. This would allow us to power not just ourselves, but to also export enormous amounts of clean energy to Europe. There exists scope for Strandhill SEC to work with the developers of the proposed Aniar fixed and floating arrays (see Figure 8-2) to benefit the community, and the offshore renewable sector.

Emerging technologies such as wave and tidal energy devices are forecast to enter the market, alongside offshore wind in the decades ahead, the industry in pre-commercial with numerous demonstrator sites globally. Sustainable energy communities can play an important part in the development of these emerging marine technologies in Ireland. Working with developers on

community-led demonstrator projects can help bring them into the focus and improve their acceptance in society. This can also help indigenous developers trial their product in real conditions.
Sligo Bay has a predicted peak springtime velocity of 0.7 m/s is one of the few locations in the west that would warrant further investigation. Figure 8-3 shows Sligo Bay as one of the few locations on the west coast with tidal energy potential.

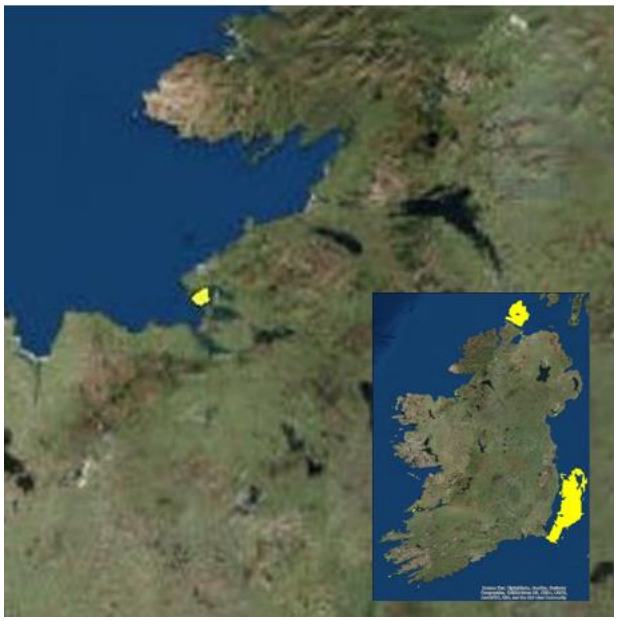


Figure 8-3: Areas of potential tidal energy in Irish waters, (inset), Sligo Bay is one of the few locations on the west coast with potential (DCENR, 2012).

A feasibility study should be carried out to assess the potential available power in the channel between Coney Island and Rosses Point, suitable tidal technology, and an environmental impact assessment (areas is within an SAC).

Figure 8-4: Coney Island Pier (left) and channel with high tidal energy

Coastal erosion is becoming a bigger problem globally; Strandhill's famous waves bring recreation, tourism and beauty but also is accompanied by the destruction of beaches and dunes. As more nature-

based solutions are being explored by, for example, the ATU led SCORE project, more engineering may need to be done alongside this. The SEC should consider a feasibility study of a pier mounted device.

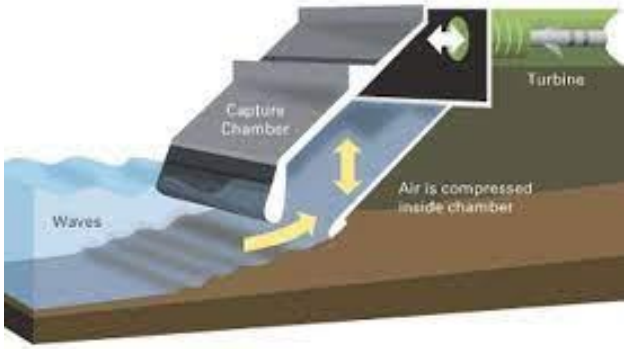


Figure 8-5: Steps at Strandhill's seafront and an illustration of pier-mounted wave energy conversion device (Graphic courtesy: energy.mit.edu)

8.4 Community-Led Projects

Example of a community LED Solar PV is Southill Community Solar Farm. Southill Community Energy has developed and operates Southill Solar which is a community-owned 4.5MW solar farm on a 20-acre site on the Cornbury Estate, that has been generating green energy since 2016. It produces enough green energy to power over 1000 homes in Charlbury, Finstock & Fawler for the next 25 years.

The site is south-facing and on a slope, making it an ideal location for our photovoltaic (PV) panels to do their work.

The panels convert sunlight into energy by generating a direct current (DC) of electricity. This is then passed through an inverter to convert it into an alternating current (AC), which is fed into the National Grid via the nearby sub-station.

Solar panels do not need direct sunshine to work, but can also generate electricity even in overcast weather

8.4.1 HOW MUCH ELECTRICITY DOES SOUTHILL GENERATE?

It is estimated that for every 5 megawatts (MW) installed, a solar farm will power 1,500 homes annually (based on an average annual consumption of 3,300 kWh of electricity per household) and save 2,150 tonnes of CO_2. Roughly 25 acres of land is required for every 5 MW.

To view the live electricity generation data from the Southill Community Farm click on the following link: https://southillcommunityenergy.coop/live-data

A similar project could be developed within the Strandhill SEC area utilising the Renewable Electricity Support Scheme (RESS) for a 100% Community Owned Solar PV Farm.

9 Strandhill SEC Strategy & Work Plan

9.1 Strandhill SEC's 3-Year Sustainable Energy Roadmap for the study area

Steps Necessary for Delivery	Proposed Output	Timeline	Lead	Key Stakeholders
Develop and link energy efficiency, renewable energy and smart energy education resources through the SEAI Primary Schools, Energy in Education programme.	Primary students from Junior Infants to Sixth Class are thought all about energy and the environment.	Q4 2022 / Q1 2023	Strandhill NS	https://www.seai.ie/community-energy/schools/primary-school/
Engage with an SEAI Project Coordinator for the non-domestic building opportunities identified in the two audit reports.	Community Energy Grant Funding support for Strandhill NS and Strand Campus energy efficiency and renewable energy opportunities	Q4 2022	Strandhill SEC	SEAI, Grant Applicants
Energy efficiency and renewable energy awareness workshops for the community – Domestic Focus	Engagement with local householders to raise awareness on home energy upgrade opportunities, home energy grant supports	2023	Sligo CoCo, Strandhill SEC	Strandhill SEC, Sligo CoCo, SEAI Website Resources, SEAI Registered Contractors
Active Travel Awareness. It is	Increased focus and promotion	2023	Strandhill SEC	Strandhill SEC, Sligo CoCo

notable that Strandhill SEC has a lower proportion of residents commuting by foot than the national average. It is likely that there are many reasons for this including the rural nature of the area. However, this statistic does highlight potential for improvement.	locally on active travel and cycle routes in Strandhill and Strandhill to Sligo Town for commuters.			
Build on current Strandhill Cycle Bus with a view to increase commuter journeys via bike both locally and into Sligo.	Reduced car usage for commuters. Active Travel programme from Strandhill to Sligo Town to be launched.	2024	Strandhill SEC	Sligo CoCo
Upgrade of the Strandhill greenway	Segregated cycle path between S'hill and Sligo Town	2025	Strandhill SEC	Sligo Co.Co, Sligo Cycle Campaign and National Transport Authority.
5% of homes to BER B2 or better	Householders applying for grant funding through the One Stop Shop or Individual Grant Supports	2024	Strandhill SEC	SEAI, building contractors, Strandhill SEC
Upgrade of 5 No. Non-Domestic Building with energy efficiency measures – Fabric first approach	Energy efficiency works completed on Non-Domestic Buildings	2024	Strandhill SEC	SEAI, Contractors, Strandhill SEC

15% of homes to BER B2 or better. Shallower retrofits for all other homes	Householders applying for grant funding through the One Stop Shop or Individual Grant Supports. Transition from oil & solid fuel to heat pumps.	2025	Strandhill SEC	SEAI, building contractors, Strandhill SEC
Renewable energy installs for Non-Domestic Buildings	Solar PV, Heat Pumps and Biomass Installs for local buildings.	2026	Strandhill SEC	SEAI, building contractors, Strandhill SEC
25% of homes to BER B2 or better. Shallower retrofits for all other homes	Householders applying for grant funding through the One Stop Shop or Individual Grant Supports. Transition from oil & solid fuel to heat pumps.	2026	Strandhill SEC	SEAI, building contractors, Strandhill SEC
40% of private cars to be EV	Private householder's Electric vehicle purchases increasing to 40%	2027	Strandhill SEC	Local EV Dealerships, SEAI, Strandhill SEC

Table 9-1 Strandhill SEC's 3-Year Sustainable Energy Roadmap

9.2 Climate Action Plan

The All of Government Climate Action Plan (CAP) recognises that meeting Ireland's climate goals requires a step change in decarbonising the economy over the next decade that will see entire sectors undergo radical changes and create new types of enterprises and jobs. The CAP refers to the Irish shortfall by EU standards for housing energy performance and acknowledges that the current annual

retrofit activity for existing stock is far too limited both in numbers of homes and depth of measures. The CAP 2021 essentially provides a strategy for the next decade, up to 2030. For the purpose of the Strandhill SEC work plan, key actions of the CAP are outlined in the 4 strands illustrated in Fig 9-1.

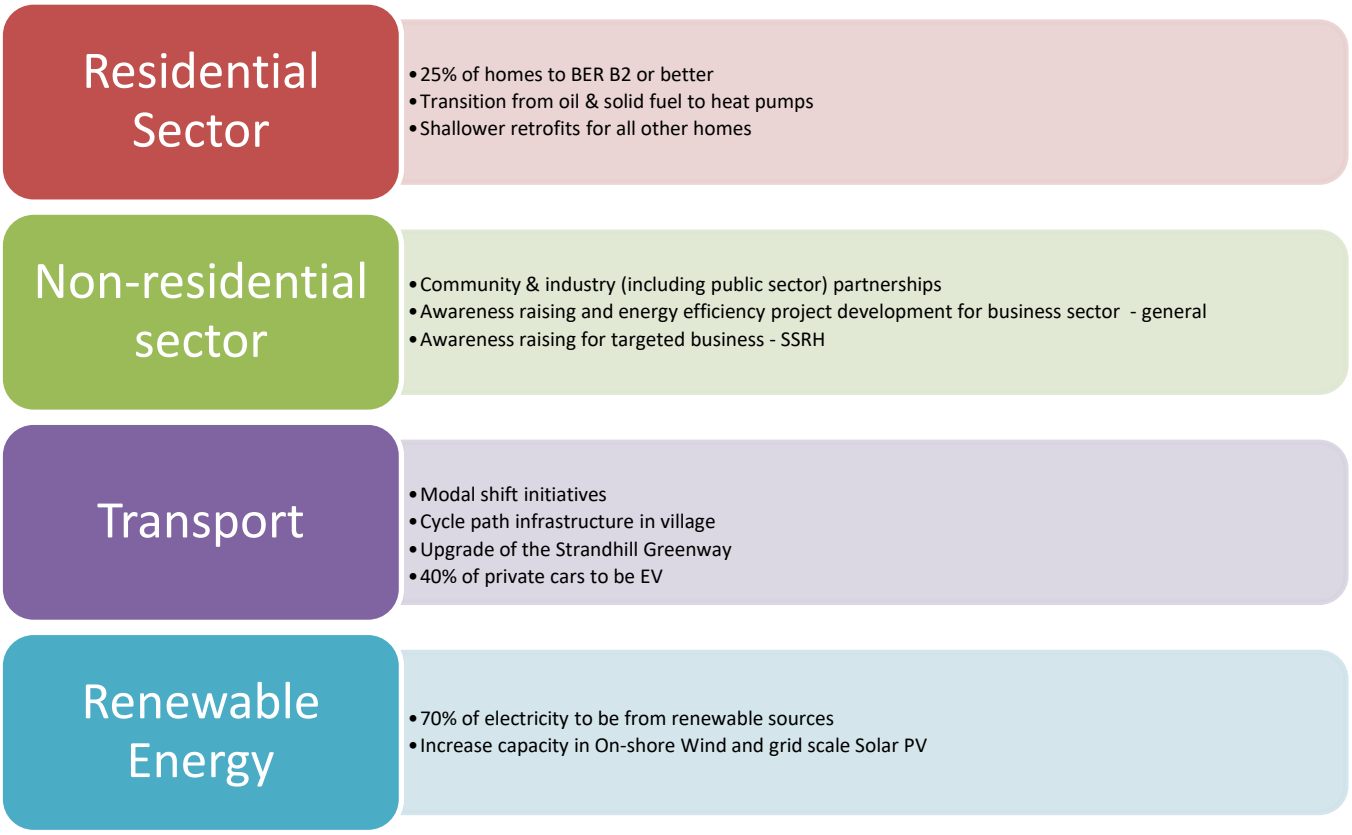


Figure 9-1 Climate Action Plan key targets to 2030

9.3 Retrofitting Homes

The most cost-effective abatement measure for the built environment identified in the CAP's Marginal Abatement Cost Curve (MACC) is to retrofit existing dwellings that use oil boilers to a B2 equivalent BER. The study area is not serviced by the Natural Gas network. Therefore, the choice of installing a natural gas boiler will not be available to homeowners that choose to carry out upgrades. Heating upgrades to homes in the study area are likely to focus on heat pump installations. These homes will need to be 'heat pump' ready, i.e. have a good level of insulation and airtightness.

9.3.1 BER B2 AND THE NEW BUILDING REGULATIONS

The CAP has set BER B2 as a marker for energy performance in retrofitting homes. This reflects the new Building Regulations – Part L[3], which now stipulate those existing buildings undergoing 'Major Renovation' must achieve a BER B2 or 'Cost optimal' level of energy performance. 'Major renovation' refers to upgrades including External Wall Insulation (EWI) or Internal Wall Insulation (IWI) on more than 25 % of the surface of the building envelope. Other works such as Cavity Wall Insulation (CWI), roof renovation, floor renovation and glazing are not considered to constitute 'Major renovation'. Fig 9-2 provides a flowchart to determine how to plan home retrofitting to meet the new Part L.

Fig 9-2 demonstrates that the new Part L does not require a heat pump. However, where a heating upgrade is required, installing a new oil or gas boiler will mean locking the home into fossil fuels (and carbon taxes) for a further 12 – 15 years. It should also be noted that SEAI no longer provides grant support for fossil fuel boilers.

The CAP also includes an action to ascertain the optimal volume and mix of deep and medium home energy efficiency upgrades. This recognises that any large scale residential retrofit project is likely to include homes having shallower retrofit measures, i.e. more than 25% of homes will be involved in any comprehensive work plan.

[3] https://www.housing.gov.ie/sites/default/files/publications/files/tgd_l_dwellings_2019.pdf

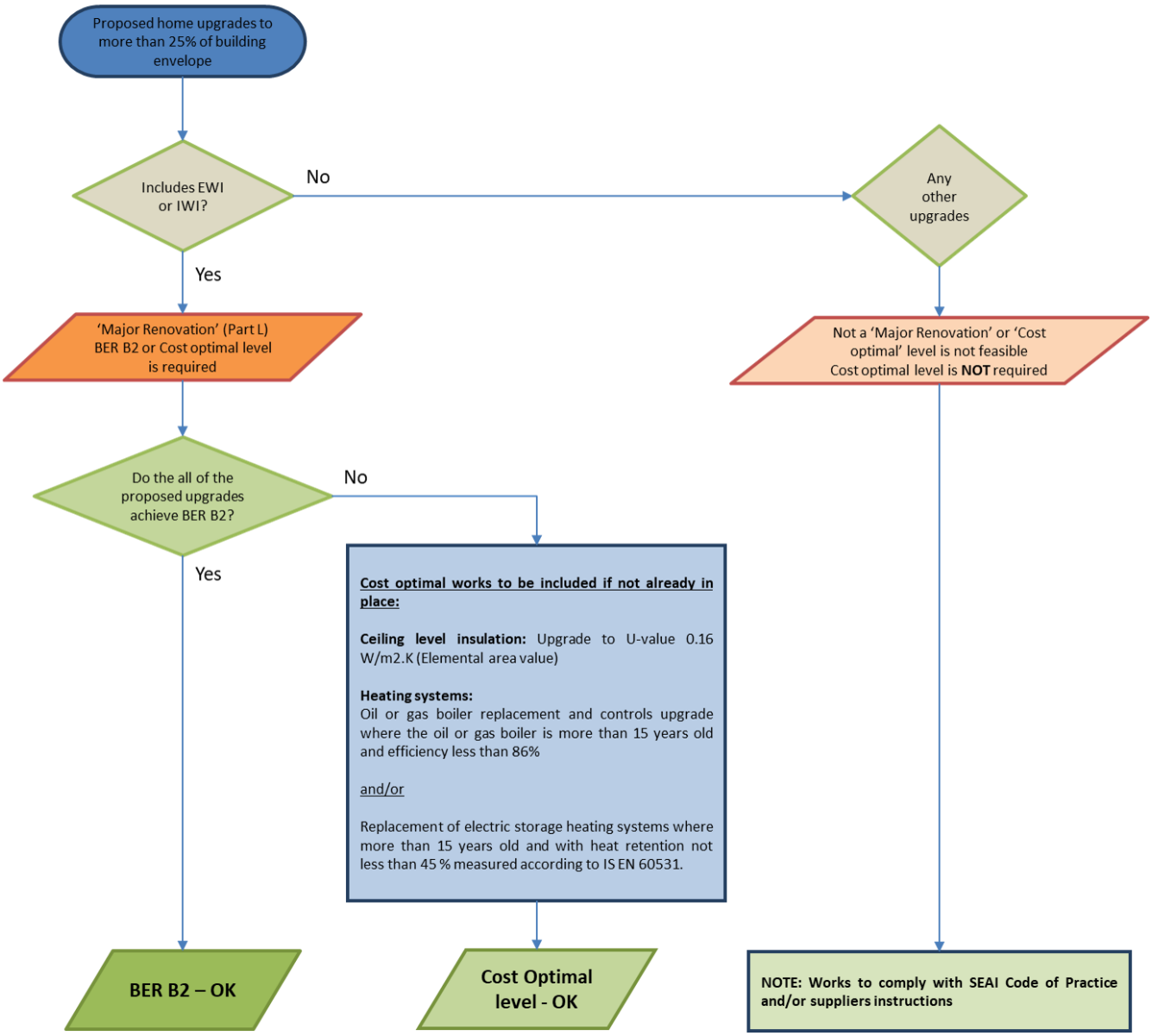


Figure 9-2 New Part L flowchart for 'Major renovation' works

9.3.2 WORK PLAN FOR HOME RETROFITTING

Due to the predominance of the residential sector in the area, home retrofitting is likely to remain the main focus for community energy projects. Taking the CAP as the direction, a 10-year work plan for retrofitting homes could be set objectives as follows:

- 25% of homes to B2 or Cost Optimal level
- 50% of other homes to BER improvement of 100 kWh/m2/year

It would also be recommended to establish partnerships with heat pump service and & installers, as this is likely to be a major element for home retrofitting.

It is also recommended that the SEC team strengthen their own capacity, through working with such partners, to develop the skills and experience to play a larger role in the delivery of these projects.

9.4 Non-residential sector

The CAP is less specific in setting targets for the Enterprise sector, but it outlines high level aims to develop more effective pathways for decarbonisation. Much of this is focused on large industry and high energy use sectors such as cement and food production. The SEC team should maintain regular engagement with local businesses in order to include them in community energy projects when possible. Inclusion of non-residential sector projects is a requirement for SEAI Community Energy Grants.

Another strategy to explore would be that of a partnership with a larger industry or public sector organisation, such as:

- Sligo County Council

Such organisations could take the role of Lead Applicant for community retrofit or other energy projects and initiatives as referred to in the following sections.

Increased engagement with the non-residential sector will facilitate a more targeted work plan. However, for the purpose of setting targets it is sufficient at this stage to a small number of non-residential projects to include in each year.

9.5 Transport

The proposed opportunities for modal shift and transition to EVs are outlined in Section 6 of this document. To pursue any one of the proposals will be a project in itself. Should the SEC team choose to pursue any one of the proposals, a dedicated sub-team would be recommended as this will be a project in itself. Partnerships, such as those referred to above, should be explored to support such projects.

9.6 Renewable Energy

The Renewable Energy Support Scheme (RESS) aims to address barriers that are preventing SECs from engaging in renewable energy community-owned projects. They are addressing financial, planning and grid issues and are currently engaging with ESB networks, other government departments and stakeholders. The outcomes from this may make it feasible for the SEC to advance a renewable energy community-owned project.

The Department for Communications, Climate Action and Environment (DECC) have recently published the Terms and Conditions for the Second Competition under the Renewable Electricity Support Scheme

(RESS 2) on their website. Please follow this link which will redirect you to the DECC website: https://www.gov.ie/en/publication/7f0bb-renewable-electricity-support-scheme-2-ress-2/

The Renewable Electricity Support Scheme (RESS) provides support to renewable electricity projects in Ireland. With a primary focus on cost effectiveness, the RESS delivers a broader range of policy objectives, including:

- providing an Enabling Framework for Community Participation through the provision of pathways and supports for communities to participate in renewable energy projects
- increasing technology diversity by broadening the renewable electricity technology mix
- delivering an ambitious renewable electricity policy to 2030 increasing energy security, energy sustainability and ensuring the cost effectiveness of energy policy

Should the SEC team wish to explore this further, it is recommended to first identify landowners in the area. This should then be followed up by inviting these landowners to a closed meeting to discuss the opportunity for a renewable energy generation, a Wind Farm or Solar PV Farm development. If there is a consensus to explore the opportunity, an application should then be made to LEADER (or a similar source) to carry out a feasibility study for a renewable energy development in the areas identified. This would then put the SEC in a stronger position to start negotiations with a potential developer partner or partners.

9.7 Non-Domestic Renewable Opportunities

Each Non-Domestic renewable opportunity is detailed in the reports completed for each business/community building and organisation which is relative to their operations and for that reason the information is confidential.

10 Appendix

10.1 Grant amounts available for private homeowners

You can access a wider range of grants using a One Stop Shop than if you were to manage the project yourself.

Grant name	Types of home	Grant Value
Heat Pump Systems	All Houses	€6,500
	Apartments	€4,500
Central Heating System for Heat Pump	All Houses	€2,000
	Apartments	€1,000
Heat Pump Air to Air		€3,500
Heating Controls		€700
Launch bonus for reaching B2 with a Heat Pump		€2,000
Solar Hot Water		€1,200
Attic insulation	Apartment (any)	€800
	Mid-Terrace	€1,200
	Semi-detached or end of terrace	€1,300
	Detached house	€1,500
Rafter insulation	Apartment (any)	€1,500
	Mid-Terrace	€2,000
	Semi-detached or end of terrace	€3,000
	Detached house	€3,000
Cavity wall insulation	Apartment (any)	€700
	Mid-Terrace	€800

Grant name	Types of home	Grant Value
Heat Pump Systems	All Houses	€6,500
	Apartments	€4,500
	Semi-detached or end of terrace	€1,200
	Detached house	€1,700
Internal Insulation (Dry Lining)	Apartment (any)	€1,500
	Mid-Terrace	€2,000
	Semi-detached or end of terrace	€3,500
	Detached house	€4,500
External Wall Insulation (The Wrap)	Apartment (any)	€3,000
	Mid-Terrace	€3,500
	Semi-detached or end of terrace	€6,000
	Detached house	€8,000
Windows (Complete Upgrade)	Apartment (any)	€1,500
	Mid-Terrace	€1,800
	Semi-detached or end of terrace	€3,000

Grant name	Types of home	Grant Value
Heat Pump Systems	All Houses	€6,500
	Apartments	€4,500
	Detached house	€4,000
External Doors (max. 2)		€800 per door
Floor Insulation		€3,500
Solar PV	0 to 2 kWp €900/kWp	
	2 to 4 kWp €300/kWp	
Mechanical Ventilation		€1,500
Air Tightness		€1,000
Home Energy Assessment		€350
Project Management	Apartment (any)	€800
	Mid-Terrace	€1,200

Grant name	Types of home	Grant Value
Heat Pump Systems	All Houses	€6,500
	Apartments	€4,500
	Semi-detached or end of terrace	€1,600
	Detached house	€2,000